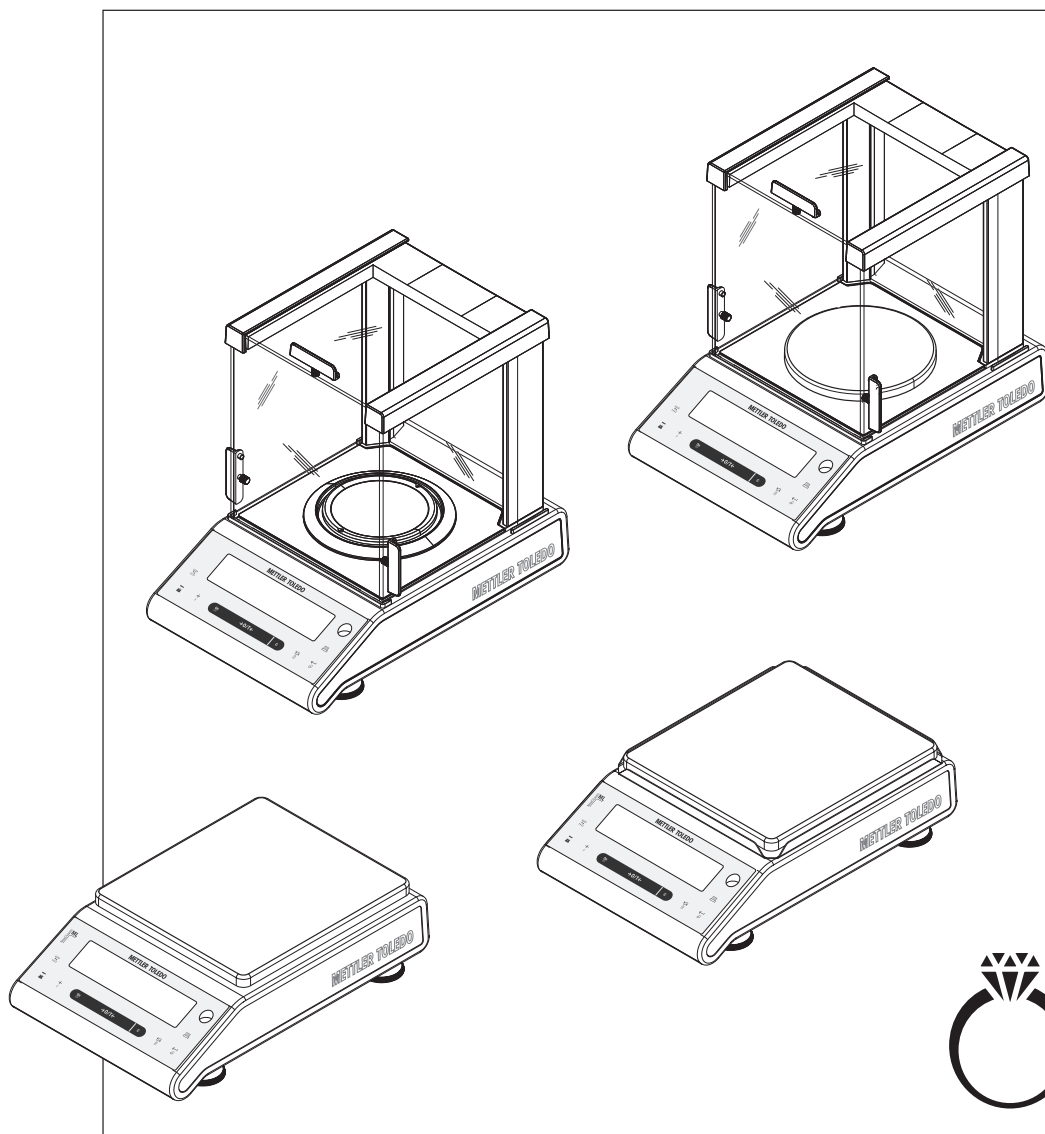


Jewelry Balances

JP/JS Models



METTLER TOLEDO

Table of Contents

1	Introduction	7
	1.1 Conventions and Symbols Used in These Operating Instructions	7
2	Safety Precautions	8
3	Overview	9
	3.1 Components	9
	3.2 Operation Keys	10
	3.3 Display Panel	11
4	Setting up the Balance	13
	4.1 Unpacking and Delivery Inspection	13
	4.2 Installing the Components	14
	4.3 Selecting the Location and Leveling the Balance	15
	4.3.1 Selecting the Location	15
	4.3.2 Leveling the Balance	15
	4.4 Power Supply	16
	4.4.1 AC Operation	16
	4.4.2 Battery Operation	16
	4.5 Transporting the Balance	17
	4.6 Weighing Below the Balance	18
	4.7 General Requirements	18
	4.7.1 Switching on the Balance	18
	4.7.2 Adjusting the Balance	18
	4.8 Adjustment (Calibration)	19
	4.8.1 Fully Automatic Adjustment FACT	19
	4.8.2 Adjustment with Internal Weight	19
	4.8.3 Adjustment with External Weight	19
	4.8.4 Customer fine adjustment	20
5	Weighing Made Simple	22
	5.1 Switching the Balance On and Off	22
	5.2 Performing a Simple Weighing	23
	5.3 Zero Setting	23
	5.4 Switching Weight Units	23
	5.5 Recall / Recall Weight Value	24
	5.6 Weighing with the Weighing-in Aid	24
	5.7 Print / Transmit Data	24
6	The Menu	25
	6.1 What is in the Menu ?	25
	6.2 Menu Operation	26
	6.3 Description of Menu Topics	27
	6.3.1 Main Menu	27
	6.3.2 Basic Menu	27
	6.3.3 Advanced Menu	29
	6.3.4 Interface Menu	32

7	Applications	37
7.1	Application "Piece Counting"	37
7.2	Application "Percent Weighing"	40
7.3	Application "Check Weighing"	42
7.4	Application "Statistics"	45
7.5	Application "Totaling"	47
7.6	Application "Multiplication Factor Weighing"	49
7.7	Application "Division Factor Weighing"	51
7.8	Application "Density"	53
7.8.1	Density Determination of Solids	53
7.8.2	Density Determination of Liquids	55
7.8.3	Formulae Used to Calculate Density	56
7.9	Application "Routine Test"	59
7.10	Application "Diagnostics"	62
7.10.1	Repeatability Test	62
7.10.2	Display Test	63
7.10.3	Key Test	64
7.10.4	Motor Test	65
7.10.5	Balance History	65
7.10.6	Calibration History	66
7.10.7	Balance Information	67
7.10.8	Service Provider Information	68
8	Communication with Peripheral Devices	69
8.1	Function PC-Direct	69
9	Firmware (Software) Updates	71
9.1	Operating Principle	71
9.2	Update Procedure	71
10	Error and Status Messages	73
10.1	Error Messages	73
10.2	Status Messages	74
11	Cleaning and Service	75
12	Interface Specification	76
12.1	RS232C Interface	76
12.2	MT-SICS Interface Commands and Functions	76
13	Technical Data	77
13.1	General Data	77
13.2	Model-Specific Data	78
13.2.1	Carat Balances with Readability of 0.001 ct	78
13.2.2	Gold Balances with Readability of 0.001 g	80
13.2.3	Gold Balances with Readability of 0.01 g	81
13.2.4	Gold Balances with Readability of 0.1 g	84
13.3	Dimensions	85
13.3.1	Carat Balances with Readability of 0.001 ct	85

	13.3.2	Gold Balances with Readability of 0.001 g	86
	13.3.3	Gold Balances with Readability of 0.01 g	87
	13.3.4	Gold Balances with Readability of 0.1 g	88
14	Accessories and Spare Parts		89
	14.1	Accessories	89
	14.2	Spare Parts	93
	Index		95

1 Introduction

Thank you for choosing a METTLER TOLEDO balance.

The precision balances of the Jewelry line combine a large number of weighing possibilities with easy operation.

These operating instructions

- apply to all balance models JP/JS in the Jewelry line.
- are based on the initially installed firmware (software) version V1.50.

However, the different models have different characteristics regarding equipment and performance. Special notes in the text indicate where this makes a difference to operation.

1.1 Conventions and Symbols Used in These Operating Instructions

Key designations are indicated by double angular brackets (e.g. «»).



This symbol indicates press key briefly (less than 1.5 s).



This symbol indicates press and hold key down (longer than 1.5 s).



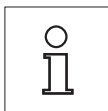
This symbol indicates a flashing display.



This symbol indicates an automatic sequence.



These symbols indicate safety notes and hazard warnings which, if ignored, can cause personal danger to the user, damage to the balance or other equipment, or malfunctioning of the balance.



This symbol indicates additional information and notes. These make working with your balance easier, as well as ensuring that you use it correctly and economically.

2 Safety Precautions

Always operate and use your balance only in accordance with the instructions contained in this manual. The instructions for setting up your new balance must be strictly observed.

If the balance is not used according to these Operating Instructions, protection of the balance may be impaired and METTLER TOLEDO assumes no liability.



It is not permitted to use the balance in explosive atmosphere of gases, steam, fog, dust and flammable dust (hazardous environments).



For use only in dry interior rooms.

Do not use sharply pointed objects to operate the keyboard of your balance! Although your balance is very ruggedly constructed, it is nevertheless a precision instrument. Treat it with corresponding care.

Do not open the balance: It does not contain any parts which can be maintained, repaired, or replaced by the user. If you ever have problems with your balance, contact your METTLER TOLEDO dealer.

Use only balance accessories and peripheral devices from METTLER TOLEDO; they are optimally adapted to your balance.



Use only the original universal AC adapter delivered with your balance.



Disposal

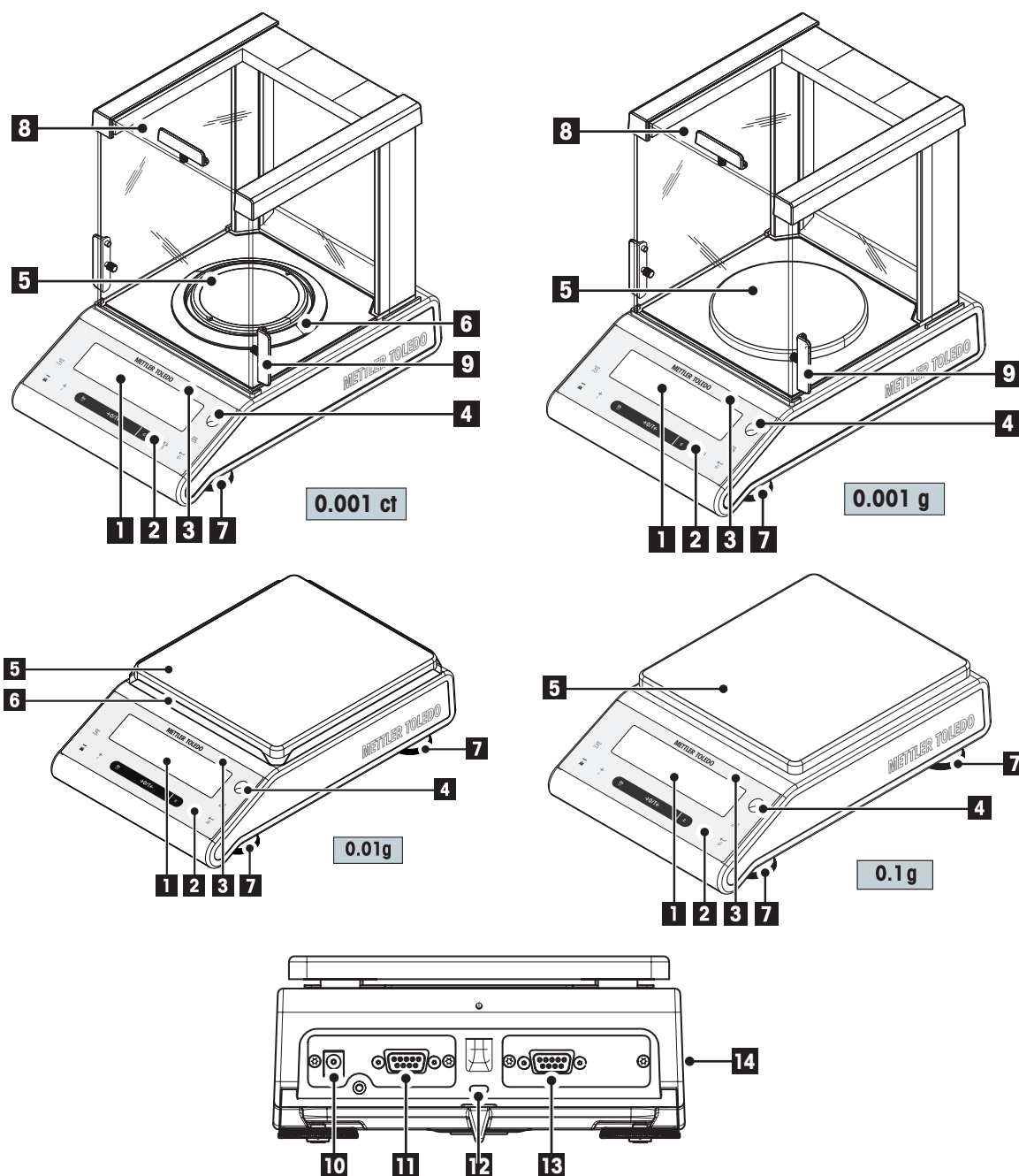
In conformance with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE) this device may not be disposed of in domestic waste. This also applies to countries outside the EU, per their specific requirements.

Please dispose of this product in accordance with local regulations at the collecting point specified for electrical and electronic equipment. If you have any questions, please contact the responsible authority or the distributor from which you purchased this device. Should this device be passed on to other parties (for private or professional use), the content of this regulation must also be related.

Thank you for your contribution to environmental protection.

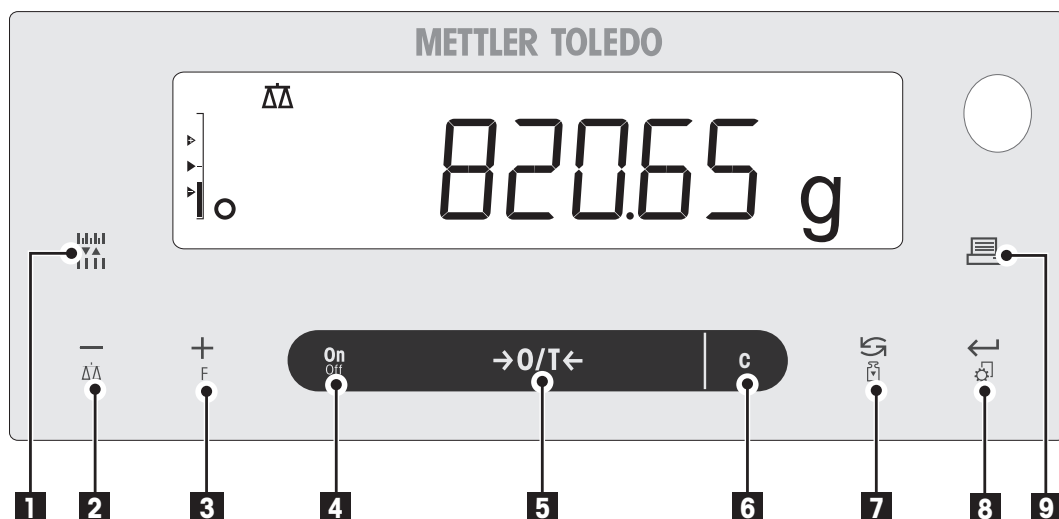
3 Overview

3.1 Components



Name and Function of Components	
1	Display
2	Operation keys
3	Model sticker (with approved models only)
4	Level indicator
5	Weighing pan
6	Draft shield ring / element
7	Leveling foot
8	Glass draft shield
9	Handle for operation of the draft shield door
10	Socket for AC Adapter
11	RS232C serial interface COM1
12	Kensington slot for anti-theft purposes
13	Second RS232C serial interface COM2 (JP models)
14	Product label

3.2 Operation Keys

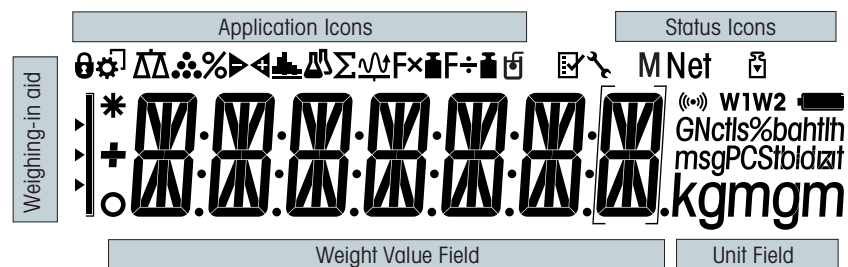


Key Functions

No.	Key	Press briefly (less than 1.5 s)	Press and hold (longer than 1.5 s)
1		- To change display resolution (1/10d function) while application is running Note: not available with approved models in selected countries.	no function
2		- To navigate back (scroll up) within menu topics or menu selections - Decrease (numerical) parameters within menu and in applications	- To select the weighing application - Decrease (numerical) parameters quickly within menu and in applications
3		- To navigate forward (scroll down) within menu topics or menu selections - Increase (numerical) parameters within menu and in applications	- To select assigned application and entering the parameter settings of application. - Default application assignment: Piece counting - Increase (numerical) parameters quickly within menu and in applications
4	ON/OFF	Switch on	Switch off
5	→0/T←	Zero	Switch off
6	C	Cancel and to leave menu without saving (one step back in the menu).	no function
7		- With entries: scroll down - To navigate through menu topics or menu selections - To toggle between unit 1, recall value (if selected), unit 2 (if different from unit 1) and the application unit (if any)	Execute predefined adjusting (calibration) procedure

No.	Key	Press briefly (less than 1.5 s) 	Press and hold (longer than 1.5 s) 
8		- To enter or leave menu selection (from / to menu topic) - To enter application parameter or switch to next parameter - To confirm parameter	- Enter or leave menu (Parameter settings) - Save parameters
9		- Printout display value - Printout active user menu settings - Transfer data	

3.3 Display Panel



Application Icons			
	Menu locked		Application "Statistics"
	Menu setting activated		Application "Totaling"
	Application "Weighing"		Application "Multiplication factor"
	Application "Piece counting"		Application "Division factor"
	Application "Percent weighing"		Application "Density"
	Application "Check weighing"		

Note

While an application is running, the corresponding application icon appears at the top of the display.

Status Icons			
M	Indicates stored value (Memory)		Acoustic feedback for pressed keys activated
	Adjustments (calibration) started	W1	Weighing range 1 (Dual Range models only)
FACT	FACT activated	W2	Weighing range 2 (Dual Range models only)
	Applications "Diagnostics" and "Routine Test"		Charge of battery: full, 2/3, 1/3, discharged (Battery operated models only)
	Service reminder		

Weight Value Field and Weighing-in aid			
	Indicates negative values		Brackets to indicate uncertified digits (approved models only)
	Indicates unstable values		Marking of nominal or target weight

Weight Value Field and Weighing-in aid						
✱	Indicates calculated values			➤	Marking of tolerance limit T+	
				➤	Marking of tolerance limit T-	
Unit Field						
GNctls%bahtlh msgPCStbdzot kgmgm	g	gram	ozt	troy ounce	tls	Singapore taels
	kg	kilogram	GN	grain	tlf	Taiwan taels
	mg	milligram	dwt	pennyweight	tola	tola
	ct	carat	mom	momme	baht	baht
	lb	pound	msg	mesghal		
	oz	ounce	tlh	Hong Kong taels		

4 Setting up the Balance



The balance must be disconnected from the power supply when carrying out all setup and mounting work.

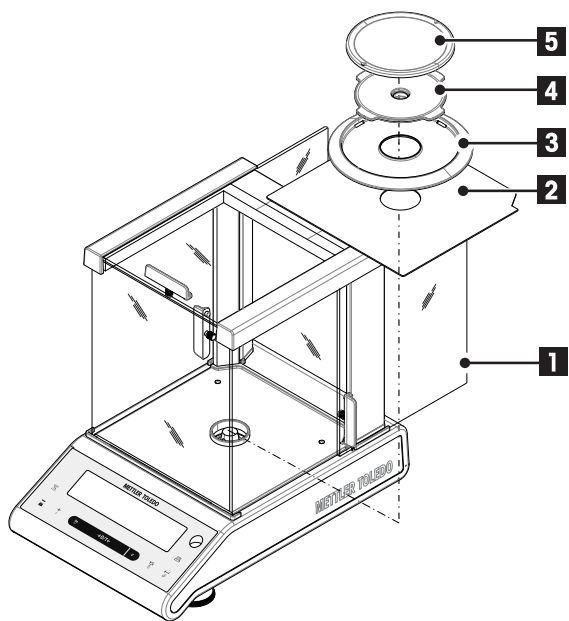
4.1 Unpacking and Delivery Inspection

- 1 Open the packaging and carefully remove all components.
- 2 Check the delivered items.

The standard scope of delivery contains the following items:

Components		Carat balances	Gold balances		
		0.001 ct	0.001 g	0.01 g	0.1 g
Draft shield	165 mm	✓	✓	–	–
Weighing pan	Ø 90 mm	✓	–	–	–
	Ø 120 mm	–	✓	–	–
	170 x 190 mm	–	–	✓	✓
Draft shield ring		✓	–	–	–
Draft shield element		–	–	✓	–
Pan support		✓	✓	✓	✓
Bottom plate		✓	✓	–	–
Protective cover		✓	✓	✓	✓
Universal AC adapter (with plug set)		✓	✓	✓	✓
Carat pan	S 80 Ø x 20 mm	✓	–	–	–
Operating instructions printed or on CD-ROM depending on the country		✓	✓	✓	✓
Quick Guide		✓	✓	✓	✓
EC declaration of conformity		✓	✓	✓	✓

4.2 Installing the Components

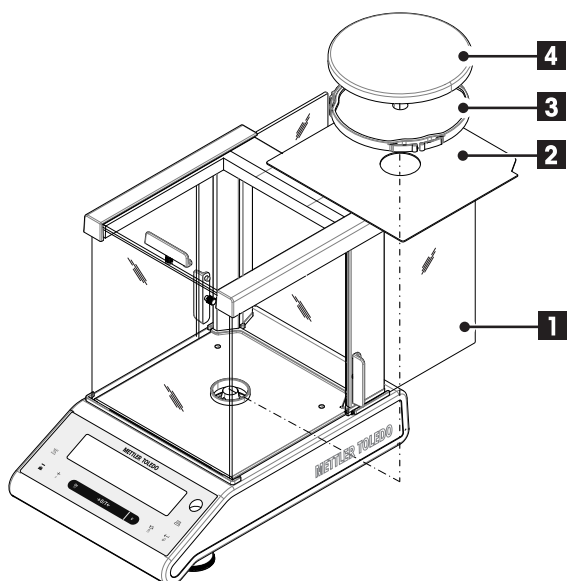


Carat balances with readability of 0.001 ct

– Place the following components on the balance in the specified order:

Note: Push the side glass door (1) back as far as will go.

- Bottom plate (2)
- Draft shield element (3)
- Pan support (4)
- Weighing pan (5)

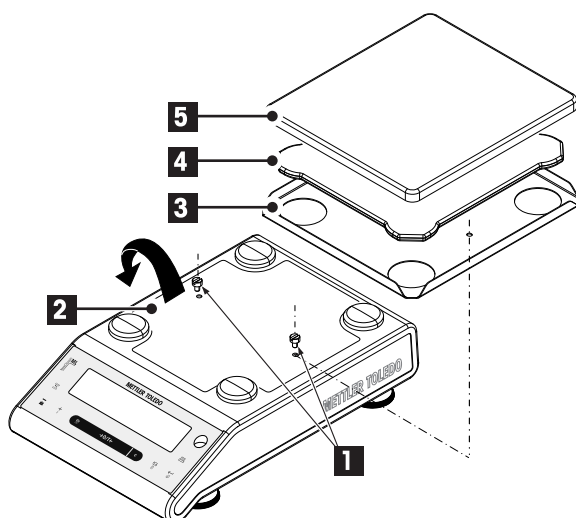


Gold balances with readability of 0.001 g

– Place the following components on the balance in the specified order:

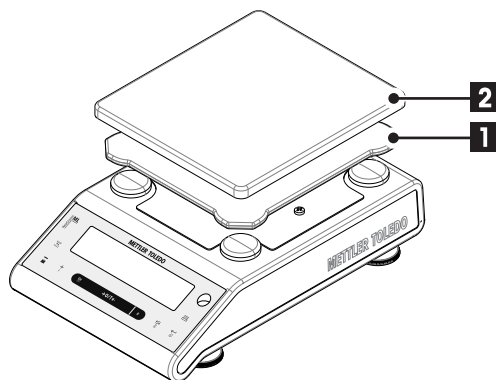
Note: Push the side glass door (1) back as far as will go.

- Bottom plate (2)
- Pan support (3) if present
- Weighing pan (4)



Gold balances with readability of 0.01g

- 1 Remove the two screws (1)
- 2 Remove the plate (2) and retain it.
- 3 Place draft shield element (3) and fix it with the two screws.
- 4 Place pan support (4) with weighing pan (5).



Gold balances with readability of 0.1 g

- Place the following components on the balance in the specified order:
 - Pan support (1)
 - Weighing pan (2)

4.3 Selecting the Location and Leveling the Balance

Your balance is a precision instrument and will thank you for an optimum location with high accuracy and dependability.

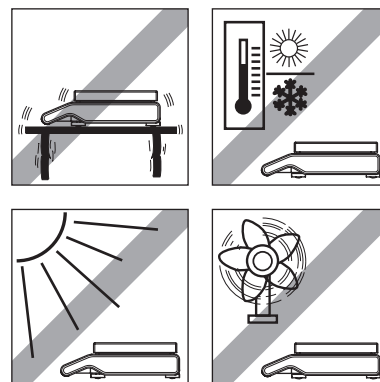
4.3.1 Selecting the Location

Select a stable, vibration-free position that is as horizontal as possible. The surface must be able to safely carry the weight of a fully loaded balance.

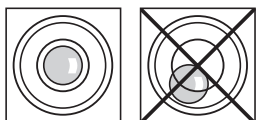
Observe ambient conditions (see Technical Data).

Avoid the following:

- Vibrations
- Excessive temperature fluctuations
- Direct sunlight
- Powerful drafts (e.g. from fans or air conditioners)

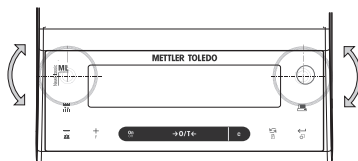


4.3.2 Leveling the Balance



The balances have a level indicator and two or four adjustable leveling feet to compensate for slight irregularities in the surface of the weighing bench. The balance is exactly horizontal when the air bubble is in the middle of the level glass.

Note: The balance should be leveled and adjusted each time it is moved to a new location.



Balances with 2 leveling feet

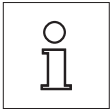
- Adjust the two front leveling feet appropriately until the air bubble comes to rest exactly in the middle of the glass:

Air bubble at	"12 o'clock"	turn both feet clockwise
Air bubble at	"3 o'clock"	turn left foot clockwise, right foot counterclockwise
Air bubble at	"6 o'clock"	turn both feet counterclockwise
Air bubble at	"9 o'clock"	turn left foot counterclockwise, right foot clockwise

Balances with 4 leveling feet

- 1 First turn the two **rear** leveling feet all the way in.
- 2 Adjust the two **front** leveling feet as previously described.
- 3 Turn the **rear** leveling feet down onto the surface for extra stabilizing safety, so the balance cannot tilt over under eccentric loads.

4.4 Power Supply



Allow your balance to warm up for 30 minutes (0.1 mg models 60 minutes) to enable it to adapt itself to the ambient conditions.

4.4.1 AC Operation

Your balance is supplied with an country-specific AC adapter or with a country-specific power cable. The power supply is suitable for all line voltages in the range: 100 - 240 VAC, 50/60 Hz (for exact specifications, see section "technical data").

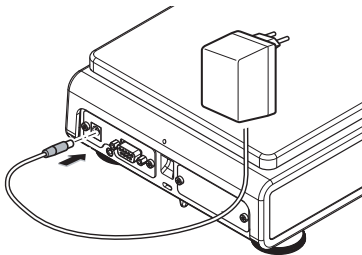


First, check the local line voltage is in the range 100 - 240 VAC, 50/60 Hz and whether the power plug fits your local power supply connection. **If this is not the case, on no account connect the balance or the AC adapter to the power supply**, but contact the responsible METTLER TOLEDO dealer.



Important:

- Before operating, check all cables for damage.
- Guide the cables so that they cannot become damaged or interfere with the weighing process!
- Take care that the AC adapter cannot come into contact with liquids!
- The power plug must be always accessible.



Connect the AC adapter to the connection socket on the back of your balance (see figure) and to the power line.

4.4.2 Battery Operation

The Balance can also operate with batteries. Under normal operation conditions, the balance works independently of the AC power line for about 8 to 15 hours (using alkaline batteries). Immediately after the AC power supply is interrupted e.g. by withdrawing the power plug or if there is a power failure, the balance switches automatically to battery operation. Once the AC power supply is restored, the balance reverts automatically to AC operation.

Note: It is also possible to use rechargeable batteries. Charging batteries inside the balance is not possible.



battery full



2/3 full



1/3 full



battery empty

When the balance is operating on its batteries, the battery symbol in the display lights up. The number of segments that are lit is an indicator of battery condition (3 = fully charged, 0 = discharged). When the batteries are almost completely discharged, the battery symbol flashes.

Inserting / Replacing Batteries

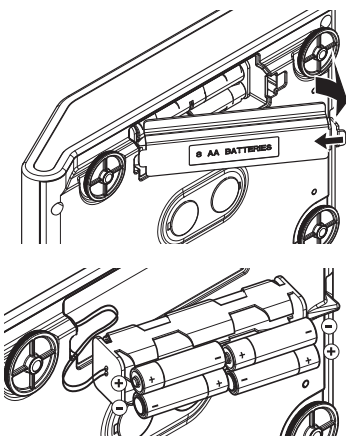


The balance must be disconnected from the power supply when carrying out all setup and mounting work.



- Make sure that the balance is off before removing or inserting batteries.
- **Do not place the balance on the pan support location bolt.**
- **Battery Warnings:** Read and follow all warnings and instructions supplied by the battery manufacturer.
- Do not mix different types or brands of batteries. Performance of batteries can vary very greatly depending on the manufacturer.
- If you don't operate the balance with batteries for an extended period, it is recommended to remove the batteries from the balance.
- Batteries must be disposed of in an environmentally responsible manner. No attempt must be made to incinerate or disassemble item.

Your balance uses 8 standard AA (LR6) batteries (alkaline batteries preferred)



- 1 Remove weighing pan, pan support and draft shield element or draft shield "100 mm" if present.
- 2 Turn the balance carefully on its side.
- 3 Open and remove the battery-chamber cover.
- 4 Insert / replace the batteries with the correct polarity as shown in the battery holder.
- 5 Insert and close the battery-chamber cover.
- 6 Turn the balance carefully to its normal position.
- 7 Reinstall all components in the reverse order.

4.5 Transporting the Balance

Switch off the balance and remove the power cable and any interface cable from the balance. Refer to the notes in Section "Selecting the location" regarding the choice of an optimal location.

Transporting Over Short Distances



For balances with a draft shield: Observe the following instructions to transport your balance over a short distance to a new location: **Never lift the balance using the glass draft shield. The draft shield is not sufficiently fastened to the balance.**

Transporting Over Long Distances

If you would like to transport or send your balance over long distances, **use the complete original packaging**.

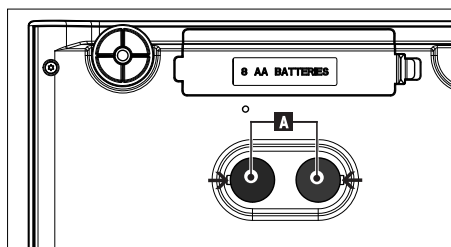
4.6 Weighing Below the Balance

The balances are equipped with a hanger for carrying out weighings below the work surface (weighing below the balance).



Attention:

- **Do not place the balance on the pan support location bolt.**



- 1 Switch off the balance and remove the power cable and any interface cable from the balance.
- 2 Remove weighing pan, pan support and draft shield element or "Easy draft shield" if present.
- 3 Turn the balance carefully on its side.
- 4 Remove one of the caps (A) depending on the models.
- 5 Then turn the balance to its normal position and simply reinstall all components in the reverse order.

4.7 General Requirements

4.7.1 Switching on the Balance

Before working with the balance, it must be warmed up in order to obtain accurate weighing results. To reach operating temperature, the balance must be connected to the power supply for at least

- 30 minutes on balances with a readability of 0.001 g (0.01 ct) to 0.1 g.
- 60 minutes on balances with a readability of 0.1 mg (0.001 ct) and better.

See also

- Adjusting the Balance (page 18)

4.7.2 Adjusting the Balance

To obtain accurate weighing results, the balance must be adjusted to match the gravitational acceleration at its location and depending on the ambient conditions. After reaching the operation temperature, adjusting is necessary

- before the balance is used for the first time.
- when the balance (readability of 0.001 ct (0.1 mg) was disconnected from the power or switched off in battery operation or in case of power failure.
- after a change of the location.
- at regular intervals during weighing service.

See also

- Switching on the Balance (page 18)

4.8 Adjustment (Calibration)

See also

- General Requirements (page 18)

4.8.1 Fully Automatic Adjustment FACT

Note: On models with FACT only.

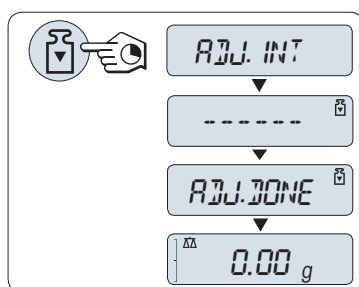
The **factory setting** is fully automatic adjustment **FACT** (Fully Automatic Calibration Technology) with the internal weight (see also section "The Menu").

The balance adjusts itself automatically:

- after the warm-up phase on connection to the power supply.
- when a change in the ambient conditions, e.g. the temperature, could lead to a noticeable deviation in the measurement.
- on a predefined time. (see menu topic "FACT")
- time interval. (with OIML accuracy class II approved models)

4.8.2 Adjustment with Internal Weight

Note: On models with internal weight only (see technical data).



Requirement: To carry out this operation, in the menu topic "**CAL**" (Adjustment) of advanced menu "**ADJ.INT**" must be selected.

- 1 Unload weighing pan
- 2 Press and hold «» to execute "Internal Adjustment".

The balance adjusts itself automatically. The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation.

Sample adjustment printout using internal weight:

```
- Internal Adjustment --
21.Jan 2010      12:56

METTLER TOLEDO

Balance Type      JP4002G
SNR               1234567890

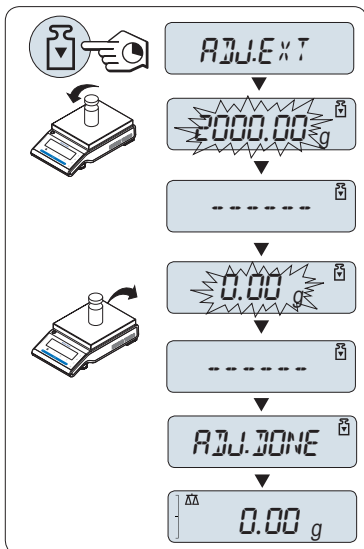
Temperature       22.5 °C
Diff              3 ppm

Adjustment done
-----
```

4.8.3 Adjustment with External Weight

Note: Because of certification legislation, the approved models cannot be adjusted with an external weight * (depend on selected countries' certification legislation).

* except OIML accuracy class I approved models.



Requirement: To carry out this operation, in the menu topic "**CAL**" (Adjustment) " of advanced menu **ADJ.EXT**" must be selected.

- 1 Have required adjustment weight ready.
- 2 Unload weighing pan.
- 3 Press and hold «CAL» to execute "External Adjustment". The required (predefined) adjustment weight value flashes in the display.
- 4 Place adjustment weight in center of pan. The balance adjusts itself automatically.
- 5 When "0.00 g" flashes, remove adjustment weight.

The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation.

Sample adjustment printout using external weight:

```

- External Adjustment --
21.Jan 2010           12:56

METTLER TOLEDO

Balance Type      JP4002G
SNR               1234567890

Temperature       22.5 °C
Nominal           2000.00 g
Actual            1999.99 g
Diff              5 ppm

Adjustment done

Signature

.....
-----

```

4.8.4 Customer fine adjustment

Attention

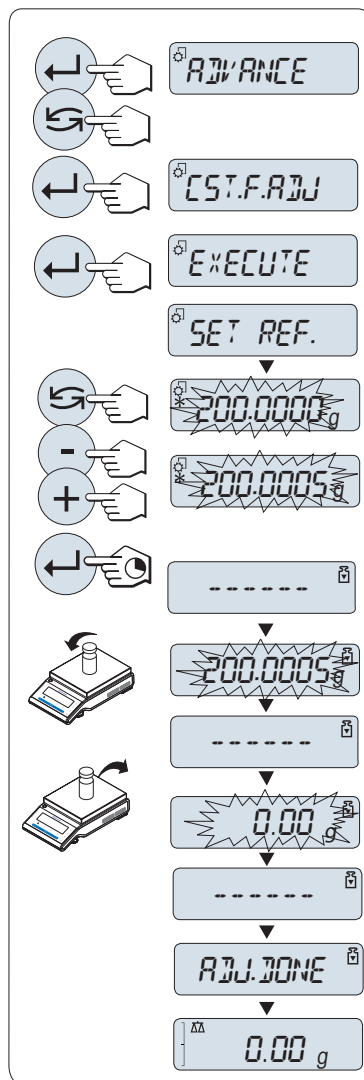
This function should be executed only by trained personnel.

The function customer fine adjustment "**CST.F.ADJ**" allows you to adjust the value of the internal adjustment weight with your own adjustment weight. The adjustable range of the adjustment weight is possible only in a very small range. Customer fine adjustment impacts the function of internal adjustment. The customer fine adjustment can be deactivated at any time.

Note

- This feature is available on models with internal weight only.
- Because of certification legislation, approved models cannot be adjusted with customer fine adjustment (depending on selected countries' certification legislation).
- Use certificated weights.

- ### Execute customer fine adjustment



- The balance is under measuring condition.
- 1 Have required adjustment weight ready.
- 2 Unload weighing pan
- 3 Select in the menu "**ADVANCE.**": **CST.F.ADJ**
- 4 Confirm "**CST.F.ADJ**" with **◀**.
- 5 To carry out this operation select "**EXECUTE**"
- 6 Start Adjustment with **◀**
⇒ "**SET REF.**" appears briefly.
⇒ The last saved value flashes on the display.
- 7 Select the target adjustment weight.
 - For coarse setting, press **↔** to change the value.
 - For fine setting, press **⬅** to increase the value or press **➡** to decrease the value.
- 8 Press and hold **◀** to confirm and execute "**CST.F.ADJ**".
⇒ The required adjustment weight value flashes in the display.
This could take some time.
- 9 Place required adjustment weight in center of pan.
- 10 Remove adjustment weight when zero is flashing.
- 11 Wait until "**ADJ.DONE**" briefly appears.
⇒ The adjusting is finished when the message "**ADJ.DONE**" appears briefly on the display. The balance returns to the last active application and is ready for operation
- ⇒ If the error message "**WRONG ADJUSTMENT WEIGHT**" appears, the weight is not within the allowed value range and could not be accepted. "**CST.F.ADJ**" could not be executed.

Storing the adjustment is not required.

1 Select in the menu "**ADVANCE.**": "**CST.F.ADJ.**".

- Setting up the Balance 21

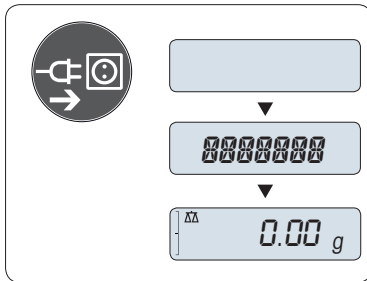
5 Weighing Made Simple



This section shows you how to perform simple weighing and how you can accelerate the weighing process.

5.1 Switching the Balance On and Off

Switching on

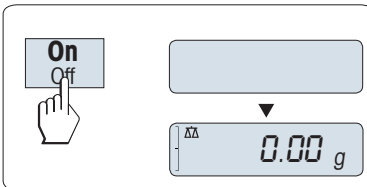


Connecting to the mains

- 1 Remove any load from weighing pan.
- 2 Connect balance via AC adapter to the mains.

The balance performs a display test (all segments in the display light up briefly), "**WELCOME**", Software version, **Maximum load** and **Readability** appears briefly.

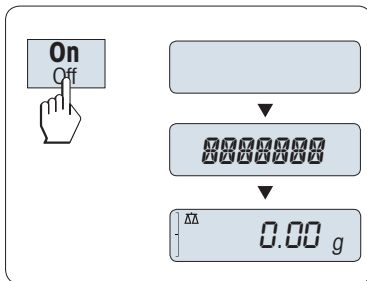
After the warm-up time, the balance is ready for weighing or for operation with the last active application, **see** General Requirements.



Mains operated (standby mode)

- Press «On».

The balance is ready for weighing or for operation with the last active application. Approved balances will execute an initial zero.



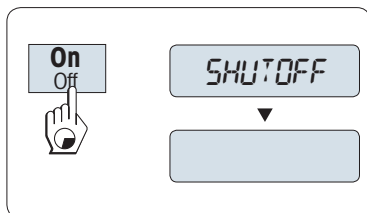
Battery operated

- 1 Remove any load from weighing pan.
- 2 Press and hold «On».

The balance performs a display test (all segments in the display light up briefly), "**WELCOME**", Software version, **Maximum load** and **Readability** appears briefly.

After the warm-up time, the balance is ready for weighing or for operation with the last active application, **see** General Requirements.

Switching off



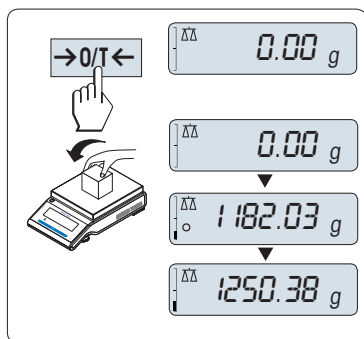
- Press and hold the «Off» key until "**SHUTOFF**" appears on the display. Release the key.
- ⇒ Mains operated balances switch into standby mode.
- ⇒ Battery operated balances switch off completely.

Note:

- After switching on from standby mode, your balance needs no warm-up time and is immediately ready for weighing.
- Standby mode is not possible with approved balances (only available in selected countries).
- If your balance has been switched off after a preselected time, the display is dimly lit and shows date, time, maximum load and readability.

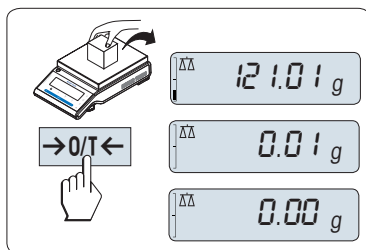
- If your balance has been switched off manually, the display is off.
- To completely switch off mains operated balances, they must be disconnected from the power supply.

5.2 Performing a Simple Weighing



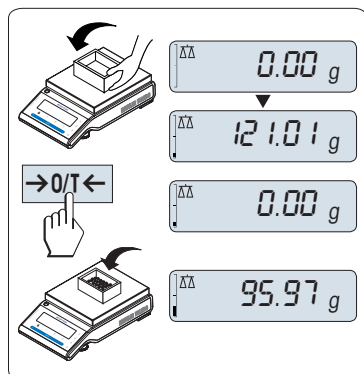
- 1 Press «→0/T←» to zero the balance.
Note: If your balance is not in the weighing mode, first press and hold the « $\Delta\Delta$ » key until "WEIGH" appears in the display. Release the key. Your balance is in the weighing mode.
- 2 Place weighing sample on the weighing pan.
- 3 Wait until the instability detector "O" disappears and the stability beep sounds.
- 4 Read the result.

5.3 Zero Setting



- 1 Unload the balance.
- 2 Press «→0/T←» to set the balance to zero. All weight values are measured in relation to this zero point.

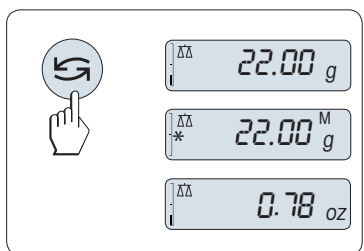
Note: Use the «→0/T←» key before you start with a weighing.



- If you are working with a weighing container, first set the balance to zero.

- 1 Place empty container on the weighing pan. The weight is displayed.
- 2 Press «→0/T←» to set the balance to zero.
⇒ "0.00 g" appears in the display.
- 3 Place weighing sample into the weighing container.
⇒ The result appears in the display.

5.4 Switching Weight Units

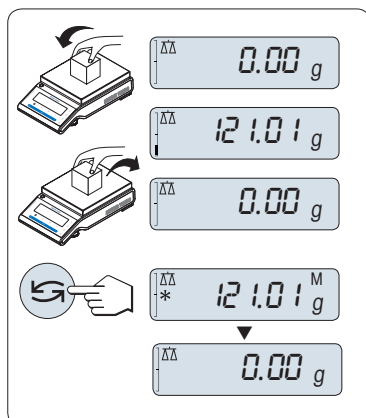


The «↺» key can be used at any time to toggle between weight unit "UNIT 1", "RECALL" value (if selected), weight unit "UNIT 2" (if different from weight unit 2) and the application unit (if any).

5.5 Recall / Recall Weight Value

Recall stores stable weights with an absolute display value bigger than 10d.

Requirement: The function "RECALL" must be activated in the menu.



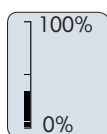
- 1 Load weighing sample. The display shows weight value and stores stable value.
- 2 Remove weighing sample. When the weight is removed the Display shows zero.
- 3 Press «↺». The display shows last stored stable weight value for 5 seconds together with asterisk (*) and Memory (M) symbols. After 5 seconds the display goes back to zero. This can be repeated unlimited times.

Delete last weight value

As soon a new stable weight value is displayed, the old recall value becomes replaced by the new weight value. When pressing «→0/T←», the recall value is set to 0.

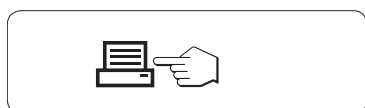
Note: If the power is switched off, the recall value is lost. The recall value can not be printed.

5.6 Weighing with the Weighing-in Aid



The weighing-in aid is a dynamic graphic indicator which shows the used amount of the total weighing range. You can thus recognize at a glance whether the load on the balance approaches the maximum load.

5.7 Print / Transmit Data



Pressing the «» key transmits the weighing results over the interface e.g. to a printer or a PC.

6 The Menu

6.1 What is in the Menu ?



The Menu allows you to match your balance to your specific weighing needs. In the menu you can change the settings of your balance and activate functions. The main menu has 4 different menus and these contains up to 37 different **topics**, each of which allows you various **selection** possibilities. For Menu "**PROTECT**" see chapter "Description of menu topics" section "Main menu".

Note: See Quick Guide for the graphical overview of the menu (Menu Map) with all setting possibilities.

Menu "BASIC"

Topic	Description
DATE	Setting the current date.
TIME	Setting the current time.
UNIT 1	Specification of the 1 st weight unit in which the balance should show the result.
UNIT 2	Specification of the 2 nd weight unit in which the balance should show the result.
KEY.BEEP	Setting the key beep level.
STB.BEEP	Setting the stability beep level.
RESET	Call up of the factory settings.

Menu "ADVANCE."

Topic	Description
WEIG.MOD	Adapting the balance to the weighing mode.
ENVIRON.	Adapting the balance to the ambient conditions.
CAL	Settings for the type of adjustment (calibration).
CST.F.ADJ	Executing customer fine adjustment.
FACT	Settings for fully automatic balance adjustment based on a selected time.
FACT.PRT	Switching the automatic FACT printout on or off.
DATE.FRM	Setting the date format.
TIME.FRM	Preselection of the time format.
RECALL	Switching the application "Recall" for storing stable weights on or off.
SHUTOFF	Setting the time after which the balance should be switched off automatically.
B.LIGHT	Setting the time after which the display backlight should be switched off automatically.
A.ZERO	Switching the automatic zero correction (Autozero) on or off.
ASSIGN:F	Selection of assigned F key application and entering their parameter settings.
DIAGNOS.	Starting a diagnostic application.
SRV.ICON	Switching the service reminder (service icon) on or off.
SRV.D.RST	Reset service date and hours (service reminder)

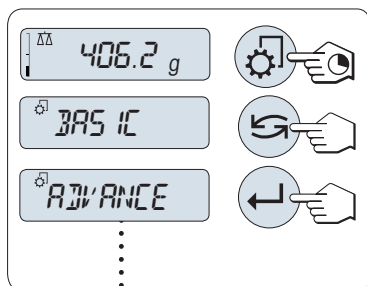
Menu "INT.FACE"

Topic	Description
RS232	Matching the serial interface RS232C to a peripheral unit.
HEADER	Setting the header for printout of individual values.
SINGLE	Setting the information for printout of individual values.
SIGN.L	Setting the footer for printout of individual values.
LN.FEED	Setting line feed for printout of individual values.
ZERO.PRT	Setting the auto print function for printing zero.
COM.SET	Setting the data communication format of the serial interface RS232C.
BAUD	Setting the transfer speed of the serial interface RS232C.
BIT.PAR.	Setting the character format (Bit/Parity) of the serial interface RS232C.

Topic	Description
STOPBIT	Setting the character format (stop bit) of the serial interface RS232C.
HD.SHK	Setting the transfer protocol (Handshake) of the serial interface RS232C.
RS E.O.L.	Setting the end of line format of the serial interface RS232C.
RS.CHAR	Setting the char set of the serial interface RS232C.
INTERVL.	Selection of the time interval for the simulated print key press.

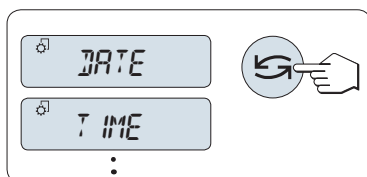
6.2 Menu Operation

In this Section you will learn how to work with the menu.



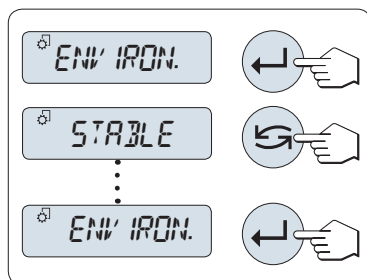
Select Menu

- 1 Press and hold «⚙» to activate main menu. The first menu "BASIC" is displayed (except menu protection is active).
- 2 Press «→» repeatedly to change menu (Scrolling down/up «+» / «-» keys).
- 3 Press «←» to confirm the selection.



Select Menu Topic

- Press «→». The next menu topic appears in the display. Each time the «→» or the «+» key is pressed, the balance switches to the next menu topic; the «-» key to the previous menu topic.

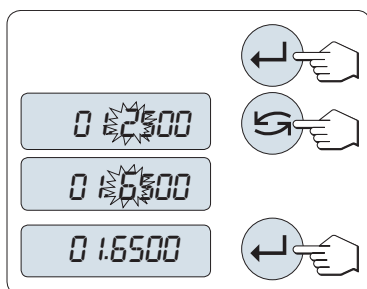


Change Settings in a Selected Menu Topic

- 1 Press «←». The display shows the current setting in the selected menu topic. Each time «→» or «+» is pressed, the balance switches to the next selection; press «-» to the previous selection. After the last selection, the first is shown again.
- 2 Press «←» to confirm the setting. For store the setting see section **Saving Settings and Closing the Menu**.

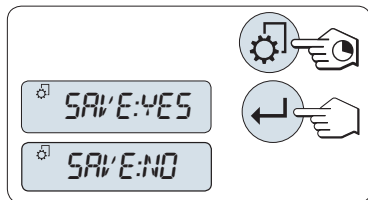
Change Settings in a Submenu Selection

The same procedure as for menu topics.



Input Principle of Numerical Values

- 1 Press «←» for input of numerical values.
- 2 Press «→» to select a digit or a value (depending on the application). The selected digit or the selected value is blinking.
- 3 For changing digits or values, press «+» to scroll up or «-» to scroll down.
- 4 Press «←» to confirm the input.



Saving Settings and Closing the Menu

- 1 Press and hold «» to leave menu topic.
- 2 Press «» to execute "**SAVE: YES**". Changes are saved.
- 3 Press «» to execute "**SAVE: NO**". Changes are not saved. To toggle between "**SAVE: YES**" and "**SAVE: NO**" press «».



Cancel

- For leaving menu topic or menu selection without saving press «**C**» (one step back in the menu).

Note: If no entry is made within 30 seconds, the balance reverts to last active application mode. Changes are not saved. If changes are made, the balance asks "**SAVE: NO**".

6.3 Description of Menu Topics

In this Section you will find information regarding the individual menu topics and the available selections.

6.3.1 Main Menu

Selecting the menu.

"**BASIC**"

The small "**BASIC**" menu for simple weighing is displayed.

"**ADVANCE.**"

The extended "**ADVANCE.**" menu for further weighing settings is displayed.

"**INT.FACE**"

The menu "**INT.FACE**" for all interface parameter settings for peripheral devices e.g. printer is displayed.

"**PROTECT**"

Menu protection. Protection of balance configurations against unmeant manipulation.

"**OFF**"

Menu protection is off. (**Factory setting**)

"**ON**"

Menu protection is on. The menu **BASIC**, **ADVANCE.** and **INT.FACE** are not displayed. This is indicated with "**6**" in the display.

6.3.2 Basic Menu

"DATE" – Date

Setting the current date according to date format.

Note: A reset of the balance will not change this setting.

"TIME" – Time

Setting the current time according to time format

"**+1H**"

Set the current time forwards by 1 hour (to adjust summer or winter time). (**Factory setting**)

"**-1H**"

Set the current time backwards by 1 hour (to adjust summer or winter time).

"**SET.TIME**"

Enter the current time.

Note: A reset of the balance will not change this setting.

"UNIT 1" – Weight Unit 1

Depending on requirements, the balance can operate with the following units (depending on the model)

- Only those weight units allowed by the appropriate national legislation are selectable.
- With approved balances, this menu topic has a fixed setting and cannot be changed.

Units:

g ¹⁾	Gram	dwt	Pennyweight
kg ³⁾	Kilogram	mom	Momme
mg ⁴⁾	Milligram	msg	Mesghal
ct ²⁾	Carat	tlh	Tael Hong Kong
lb	Pound	tls ⁵⁾	Tael Singapore
oz	Ounce (avdp)	tlt	Tael Taiwan
ozt	Ounce (troy)	tola	Tola
GN	Grain	baht	Baht

¹⁾ factory setting for gold balances

²⁾ factory setting for carat balances

³⁾ not with 0.1 mg and 1 mg balances

⁴⁾ with 0.1 mg and 1 mg balances

⁵⁾ the Malaysian tael has the same value

"UNIT 2" – Weight Unit 2

If it is required to show the weighing results in weighing mode in an additional unit, the desired second weight unit can be selected in this menu topic (depending on the model). Units see "UNIT 1".

Note: Only those weight units allowed by the appropriate national legislation are selectable.

"KEY.BEEP" – Key Beep

This menu topic allows you to select the volume of the key beep. The according key beep is emitted during the setting.

"MED"	Medium level (Factory setting)
"HIGH"	High level
"OFF"	Beep switched off
"LOW"	Low level

"STB.BEEP" – Stability Beep

If the unstable symbol disappears, the stability beep becomes active. This menu topic allows you to preselect the volume of the stability beep.

"LOW"	Low level (Factory setting)
"MED"	Medium level
"HIGH"	High level
"OFF"	Beep switched off

"RESET" – Reset Balance Settings

This menu topic allows you to call-up the factory settings.

To toggle between "YES?" and "NO?" press «».

Note: A reset of the balance will not change the "DATE" and "TIME" settings.

6.3.3 Advanced Menu

"WEIG.MOD" – weighing mode settings

This setting can be used to adapt the balance to the weighing mode.

"UNIVERS."	For all standard weighing applications. (Factory setting)
"DOSING"	For dosing liquid or powdery products. With this setting, the balance responds very quickly to the smallest changes in weight.

"ENVIRON." – Environment Settings

This setting can be used to match your balance to the ambient conditions.

"STD."	Setting for an average working environment subject to moderate variations in the ambient conditions. (Factory setting)
"UNSTAB."	Setting for a working environment where the conditions are continuously changing.
"STABLE"	Setting for a working environment which is practically free from drafts and vibrations.

"CAL" – Adjustment (calibration)

In this menu topic you can preselect the function of the «» key. Your balance can be adjusted with internal or external weights by pressing the «» key. If you have attached a printer to your balance, the data of the adjustment (calibration) are printed out.

"ADJ.OFF"	The adjustment is switched off . The «  » key has no function.
"ADJ.INT"	Internal adjustment: adjustment is performed at a keystroke with the built-in weight (depending on the model, see technical data).
"ADJ.EXT"	External adjustment: adjustment is performed at a keystroke with a selectable external weight. Note: This function is not available for approved balances * (depend on selected countries' certification legislation). * except OIML accuracy class I approved models.
"200.00 g"	Defining the external adjustment weight: define the weight of the external adjustment weight (in grams). Factory setting: depends on the model.

"CST.F.ADJ" – Customer Fine Adjustment

This function allows you to adjust the value of the internal adjustment weight with your own adjustment weight. This feature is available on models with internal weight only. For more information, see Chapter Adjustment.

"EXECUTE"	Executes customer fine adjustment (Factory setting)
"RESET"	Sets adjustment back to initial adjustment. NO?: Abort reset function YES?: Execute reset function

"FACT" – Fully Automatic Adjustment

Fully automatic internal adjustment (calibration) **FACT** (**F**ully **A**utomatic **C**alibration **T**echnology) provides fully automatic balance adjustment based on temperature criteria and on preselected time. (depending on the model, see technical data)

"TIME"	Execute FACT (with selected time).
"12:00"	Specify the time for a fully automatic adjustment to take place every day. Factory setting: 12:00 (according to time format)
"OFF"	FACT is switched off .

"FACT.PRT" – Protocol Trigger for Fact

This setting specifies whether an adjustment report should be printed automatically.

Note: This menu topic does not affect the printing of adjustments with an internal or external adjustment weight.

"OFF"	Protocol switched off: if the balance adjusts automatically (FACT), a protocol is not printed out.
"ON"	Protocol switched on: a record is printed out after every automatic adjustment of the balance (FACT). Note: The protocol is printed out without a line for signatures.

"DATE.FRM" – Date Format

This menu topic allows you to preselect the date format.

The following date formats are available:

	Display examples	Printing examples
"DD.MM.Y"	01.02.09	01.02.2009
"MM/DD/Y"	02/01/09	02/01/2009
"Y-MM-DD"	09-02-01	2009-02-01
"D.MMM Y"	1.FEB.09	1.FEB 2009
"MMM D Y"	FEB.1.09	FEB 1 2009

Factory setting: "DD.MM.Y"

"TIME.FRM" – Time Format

This menu topic allows you to preselect the time format.

The following date formats are available:

	Display examples
"24:MM"	15:04
"12:MM"	3:04 PM
"24.MM"	15.04
"12.MM"	3.04 PM

Factory setting: "24:MM"

"RECALL" – Recall

This menu topic allows you to switch the "RECALL" function on or off. When it is switched on recall stores the last stable weight if the absolute display value was bigger than 10d.

"OFF"	"RECALL" switched off (Factory setting)
"ON"	"RECALL" switched on

Note: The recall value is displayed with an asterisk and cannot be printed.

"SHUTOFF" – Automatic Shutoff

If the automatic shutoff function is activated, the balance automatically switches itself off after a preselected time of inactivity (i.e. with no key being pressed or changes of weight occurring etc.) and is switched to the standby mode.

"A.OFF:10' "	Automatic shutoff after 10 minutes of inactivity. (Factory setting)
"A.OFF – "	Automatic shutoff not activated.
"A.OFF:2' "	Automatic shutoff after 2 minutes of inactivity.
"A.OFF:5' "	Automatic shutoff after 5 minutes of inactivity.

"B.LIGHT" – Backlight

Under this menu topic, the display backlight can be switched off automatically. If the automatic switch-off is activated, the backlight will turn off automatically after the selected period of inactivity has elapsed. The backlight is reactivated when a key is pressed or the weight is changed.

"B.L. ON"	Backlight is always on . (Factory setting)
"B.L. OFF"	Backlight is always off .
"B.L. 30"	Automatic switch-off after 30 seconds inactivity.
"B.L. 1"	Automatic switch-off after 1 minute inactivity.
"B.L. 2"	Automatic switch-off after 2 minutes inactivity.
"B.L. 5"	Automatic switch-off after 5 minutes inactivity.

"A.ZERO" – Automatic Zero Setting

This menu topic allows you to switch the automatic zero setting on or off.

"ON"	"A.ZERO" switched on (factory setting). The automatic zero setting continuously corrects possible variations in the zero point that might be caused through small amounts of contamination on the weighing pan.
"OFF"	"A.ZERO" switched off . The zero point is not automatically corrected. This setting is advantageous for special applications (e.g. evaporation measurements).

Note: With approved balances, this setting is not available (only available in selected countries).

"ASSIGN:F" – Assign Application Key F

At this menu topic you can assign an application to the «F» key. The following applications are available (depending on the model):

"COUNT"	Piece counting (Factory setting)
"PERCENT"	Percent weighing
"CHECK"	Checkweighing
"STAT"	Statistics
"TOTAL"	Totaling
"FACTOR.M"	Multiplication factor
"FACTOR.D"	Division factor
"DENSITY"	Density (not available with JS models)
"R.TEST"	Routine test

"DIAGNOS." – Diagnostics Application

At this menu topic you can start a diagnostic application. For more information see chapter application "Diagnostics".

The following diagnostics are available:

"REPEAT.T"	Repeatability test (models with internal weights only)
"DISPLAY"	Display test
"KEYPAD.T"	Key test
"CAL.MOT.T"	Motor test (models with internal weights only)
"BAL.HIST"	Balance history
"CAL.HIST"	Calibration history
"BAL.INFO"	Balance information
"SRV.PROV"	Service provider information

"SRV.ICON" – Service Reminder

This menu topic allows you to switch the service reminder "🔧" on or off.

"ON"	Service reminder "🔧" switched on . You will be informed after one Year or 8000 operating hours to call service for recalibration. This will be indicated by the flashing service icon: "🔧". (Factory setting)
"OFF"	Service reminder "🔧" switched off .

"SRV.D.RST" – Service Date Reset

This menu topic allows you to reset service date and hours.

Note: This menu topic is only available if "SRV.ICON" setting "ON" was selected.

To toggle between "YES?" and "NO?" press «↺».

6.3.4 Interface Menu

"RS232" – RS232C Interface ¹⁾

At this menu topic you can select the peripheral device connected to the RS232C interface and specify how the data is transmitted.

"PRINTER"	Connection to a printer . (Factory setting) Note: • Only one printer possible. • See recommended printer settings found in section "Appendix", as well as the printer-specific user's manual.
"PRT.STAB"	If the «  » key is pressed, the next stable weight value will be printed. (Factory setting)
"PRT.AUTO"	Every stable weight value will be printed, without pressing the «  » key.
"PRT.ALL"	If the «  » key is pressed, the weight value will be printed regardless of stability.
"PC-DIR."	Connection to a PC : the balance can send data (as a Keyboard) to the PC used for PC applications e.g. Excel. Note: The balance sends the weight value without the unit to the PC.
"PRT.STAB"	If the «  » key is pressed, the next stable weight value will be sent followed by an enter. (Factory setting)
"PRT.AUTO"	Every stable weight value will be sent followed by an enter, without pressing the «  » key.
"PRT.ALL"	If the «  » key is pressed, the weight value will be sent followed by an enter regardless of stability.
"HOST"	Connection to a PC , Barcode Reader etc.: the balance can send data to the PC and receive commands or data from the PC. Note: The balance sends the complete MT-SICS answer to the PC (see chapter "MT-SICS Interface Commands and Functions").
"SND.OFF"	Send mode switched off. (Factory setting)
"SND.STB"	If the «  » key is pressed, the next stable weight value will be sent.
"SND.CONT"	All weight value updates will be sent regardless of stability, without pressing the «  » key.
"SND.AUTO"	Every stable weight value will be sent, without pressing the «  » key.

"SND.ALL"

If the «» key is pressed, the weight value will be sent regardless of stability.

"2.DISP"

Connection of an **optional auxiliary display** unit.

Note: The transmission parameters cannot be selected. Settings are automatically set.



Attention: If you select 2nd Display "2.DISP", first make sure that no other device is connected at COM1 as an auxiliary display. Other devices could be damaged because of the voltage on connector Pin 9. Necessary for powering the display (see Chapter "Interface Specification").

- The second interface COM2 if present, has no power supply for a 2nd display. Connect it preferably on COM1.

"HEADER" – Options for the Printout Header of individual values

This menu topic allows you to specify the information that is to be printed at the top of the printout for every individual weighing results (after pressing «»).

Note: This menu topic is only available if "PRINTER" setting was selected.

"NO"

The header is not be printed (**Factory setting**)

"DAT/TIM"

Date and time are printed

"D/T/BAL"

Date, time and balance information (Balance type, SNR, Balance ID) are printed.

Note: Balance ID only if set.

"SIGN.L" – Options for the Printout Footer for Signature Line of individual values

This menu topic allows you to set a footer for signature at the bottom of the printout for every individual weighing result (after pressing «»).

Note: This menu topic is only available if "PRINTER" setting was selected.

"OFF"

The signature footer is not be printed. (**Factory setting**)

"ON"

The signature footer is printed

"LN.FEED" – Options for Complete the Printout of individual values

This menu topic allows you to specify the number of blank lines to complete the printout (line feed) for every individual weighing result (after pressing «»).

Note: This menu topic is only available if "PRINTER" setting was selected.

"0"

Possible numbers of blank lines: 0 to 99 (**Factory setting = 0**)

"ZERO.PRT" – Options for "PRT.AUTO" ¹⁾

This menu topic allows you to specify the auto print function "PRT.AUTO" for printing zero "YES" or "NO".

"OFF"

Zero is not be printed (Zero +/- 3d) (**Factory setting**)

"ON"

Zero is always printed

Note: This menu topic is only available if "PRT.AUTO" function of the "PRINTER" or "PC-DIR." was selected.

"COM.SET" – Options for the Data Communication Format (RS232C)("HOST")

This menu topic allows you to set the data format depending on which peripheral device is connected.

Note: This menu topic is only available if "HOST" setting was selected.

"MT-SICS"

The MT-SICS data transfer formats is used. (**Factory setting**)
For more information see section "MT-SICS Interface Commands and Functions".

"MT-PM"

The following PM balance commands are supported:

S	Send value
SI	Send immediate value
SIR	Send immediate value and repeat
SR	Send value and repeat
SNR	Send next value and repeat
T	Tare
TI	Tare immediately
B	Base *)
MI	Modify ambient vibration
MZ	Modify Auto Zero
M	Modified settings reset
ID	Identify
CA	Calibrate
D	Display (only symbol N and G available)

*) Limitation:

- Negative values are limited up to the current tare value.
- B command is additive.
- The sum of the B values plus the previous tare value, before a "TA", "T" or "Z" is sent, must be less than the total weighing range.

"SART"

The following Sartorius commands are supported:

K	Ambient conditions: very stable
L	Ambient conditions: stable
M	Ambient conditions: unstable
N	Ambient conditions: very unstable
O	Block keys
P	Print key (print, auto print; activate or block)
Q	Acoustic signal
R	Unblock keys
S	Restart/self-test
T	Tare key
W	Calibration/adjustment (depending on the menu setting) *)
Z	Internal calibration/adjustment **)
f0_	Function key (F)
f1_	Function key (CAL)
s3_	C key
x0_	Perform internal calibration **)
x1_	Print balance/scale model
x2_	Print weighing cell serial number
x3_	Print software version

*) may be inaccessible on verified balances/scales

**) only on models with built-in motorized calibration weight

Functionality mapping

"HOST" settings:	Sartorius printer settings:
"SND.OFF"	not applicable
"SND.STB"	manually print with stability
"SND.ALL"	manually print without stability
"SND.CONT"	automatically print without stability
"SND.AUTO"	similar applicable to automatically print when load is changed

"BAUD" – Baud rate RS232C ¹⁾

This menu topic allows you to match the data transmission to different serial RS232C receivers. The baud rate (data transfer rate) determines the speed of transmission via the serial interface. For problem-free data transmission the sending and receiving devices must be set at the same value.

The following settings are available:

600 bd, 1200 bd, 2400 bd, 4800 bd, 9600 bd, 19200 and 38400 bd. (default: **9600 bd**)

Note:

- Not visible for 2nd display.
- Each device has separate settings.

"BIT.PAR." – Bit/Parity RS232C ¹⁾

At this menu topic you can set the character format for the attached RS232C serial peripheral device.

"8/NO"	8 data bits/no parity (Factory setting)
"7/NO"	7 data bits/no parity
"7/MARK"	7 data bits/mark parity
"7/SPACE"	7 data bits/space parity
"7/EVEN"	7 data bits/even parity
"7/ODD"	7 data bits/odd parity

Note:

- Not visible for 2nd display.
- Each device has separate settings.

"STOPBIT" – Stop Bits RS232C ¹⁾

At this menu topic you can set the stop bits of the transmitted data to different RS232C serial receivers.

"1 BIT"	1 Stop bit (Factory setting)
"2 BITS"	2 Stop bits

Note:

- Not visible for 2nd display.
- Each device has separate settings.

"HD.SHK" – Handshake RS232C ¹⁾

This menu topic allows you to match the data transmission to different RS232C serial receivers.

"XON.XOFF"	Software handshake (XON/XOFF) (Factory setting)
"RTS.CTS"	Hardware handshake (RTS/CTS)
"OFF"	No handshake

Note:

- Not visible for 2nd display.
- Each device has separate settings.

"RS E.O.L." – End of Line RS232C ¹⁾

At this menu topic you can set the "End of Line" character of the transmitted data to different RS232C serial receivers.

"CR LF"	<CR><LF> Carriage Return followed by Line feed (ASCII-Codes 013+010) (Factory setting)
"CR"	<CR> Carriage Return (ASCII-Code 013)
"LF"	<LF> Line feed (ASCII-Code 010)
"TAB"	<TAB> Horizontal tab (ASCII-Code 011), only settable if PC-DIR. is selected.

Note:

- Not visible for 2nd display.
- Each device has separate settings.

"RS.CHAR" – Char Set RS232C ¹⁾

At this menu topic you can set the "Character Set" of the transmitted data to different RS232C serial receivers.

"IBM.DOS"	Char Set IBM/DOS (Factory setting)
"ANSI.WIN"	Char Set ANSI/WINDOWS

Note:

- Not visible for 2nd display.
- Each device has separate settings.

"INTERVL." – Print Key Simulation

At this menu topic you can activate a simulation of the  key. "INTERVL." simulates a print key press every x seconds.

Range:	0 to 65535 seconds
0 sec:	disables the print key simulation

Factory setting: 0 sec

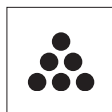
Note: The executed action is according to the configuration of the print key. (see interface setting)

1) Note for 2nd RS232C Interface (COM2)

- If a second interface is installed, the menu topic is displayed for each interface, e.g.
"BAUD.1" for standard interface (COM1)
"BAUD.2" for 2nd interface (COM2)
 - Only one printer can be set if two RS232 interfaces are existing.
-

7 Applications

7.1 Application "Piece Counting"

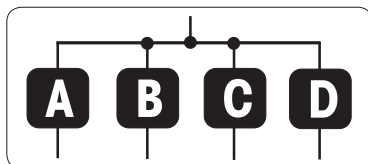


The **"Piece Counting"** application allows you to determine the number of pieces put on the weighing pan.

Requirement: The function **"COUNT"** must be assigned to the «F» key (see advanced menu topic **"ASSIGN:F"**, factory setting).

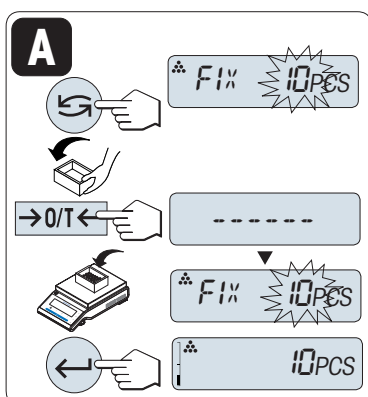


- Activate function **"COUNT"** by pressing and holding the «F» key.



Piece Counting first requires the setting of a reference weight, there are 4 possibilities:

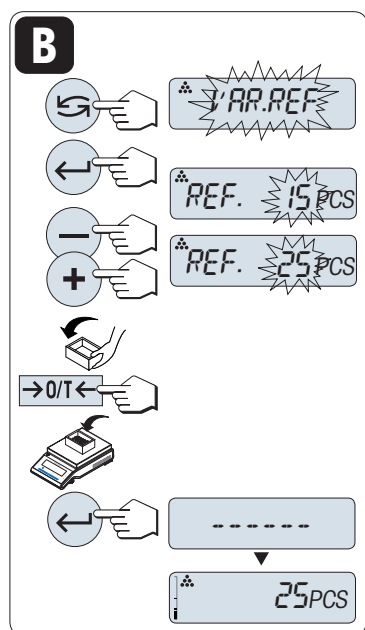
- A** Setting the reference **by multiple pieces with fix reference values.**
- B** Setting the reference **by multiple pieces with variable reference values.**
- C** Setting the reference **for 1 piece in weighing mode.**
- D** Setting the reference **for 1 piece in manual mode.**



Setting possibility

- A** **Setting the reference by multiple pieces with fix reference values.**

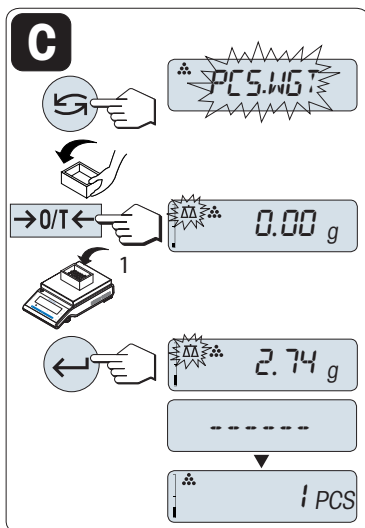
- 1 Select a number of reference pieces by scrolling with «». Possible numbers* are 5, 10, 20 and 50.
* with approved balances in selected countries: min 10
- 2 Press «0/T» to zero/tare. If needed: place empty container on the weighing pan and zero/tare again.
- 3 Add the selected number of reference pieces to container.
- 4 Press «» to confirm.



Setting possibility

- B** **Setting the reference by multiple pieces with variable reference values**

- 1 Select **"VAR.REF"** by scrolling with «». Press «» to confirm.
- 2 Select a number of reference pieces by scrolling up («+» key) or down («-» key). Speed up by press and hold. Possible numbers* are 1 to 999.
* with approved balances in selected countries: min 10
- 3 Press «0/T» to zero/tare. If using: place empty container on the weighing pan first or tare again.
- 4 Add the selected number of reference pieces to container.
- 5 Press «» to confirm.

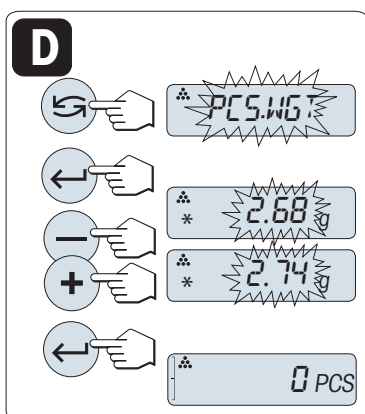


Setting possibility

C Setting the reference for one piece in weighing mode

- 1 Select "**PCS.WGT**" by scrolling with «».
- 2 Press «» to zero/tare. If needed: place empty container on the weighing pan and zero/tare again.
- 3 Add one reference piece to container. The weight of one piece is displayed.
- 4 Press «» to confirm.

Note: With approved balances, this setting is not available in selected countries.

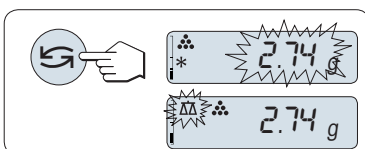


Setting possibility

D Setting the reference for one piece in manual mode

- 1 Select "**PCS.WGT**" by scrolling with «».
- 2 Press «» to confirm.
- 3 Enter the final reference one piece weight by scrolling up («» key) or down («» key). Speed up by press and hold.
- 4 Press «» to confirm.

Note: With approved balances, this setting is not available in selected countries.



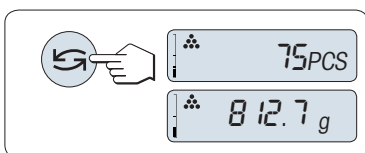
Switching between manual mode and weighing mode

- Press «» to switch between manual and weighing mode.

Note: By switching from weighing mode to manual mode the weight value will be transferred and can be changed manually.

Note: If without any key press within 60 seconds, the balance returns to the previous active application. Press «**C**» to cancel and returns to the previous active application.

On completion of the setting procedure, your balance is ready for piece counting.



Switching between piece count and weight display.

You can use the «» key at any time to switch the display between piece display, weighing unit "**UNIT 1**", "**RECALL**" value (if activated) and weighing unit "**UNIT 2**" (if different from "**UNIT 1**").

Note:

- The "**RECALL**" value is displayed with an asterisk (*) and icon "M" and can not be printed.
- Take into account minimum values: min. reference weight = 10d (10 digits), min. piece weight* = 1d (1 digit)!
- * with approved balances in selected countries: min 3e
- The current reference weight remains stored until the reference setting is changed.

Terminate the application

Press and hold «» to terminate the application and to return to the weighing application.

7.2 Application "Percent Weighing"

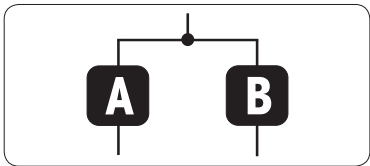


The **"Percent Weighing"** application allows you to check a sample weight as percentage to a reference target weight.

Requirement: The function **"PERCENT"** must be assigned to the «F» key (see advanced menu topic **"ASSIGN:F"**).

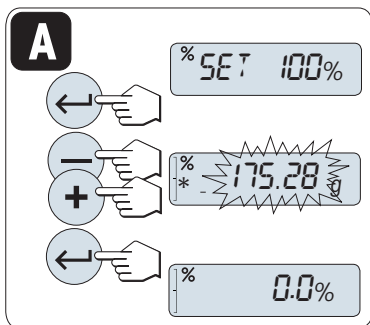


- Activate function percent weighing **"PERCENT"** by pressing and holding the «F» key.



Percent Weighing first requires the setting of a reference weight that should corresponds to 100%, there are 2 possibilities:

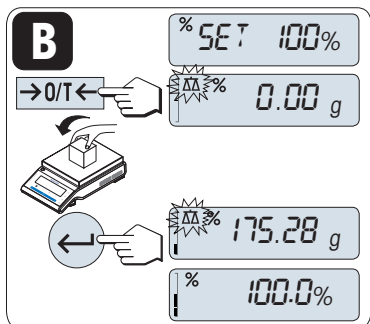
- A** Setting the reference in manual mode (enter 100%).
- B** Setting the reference in weighing mode (weigh 100%).



Setting possibility

A Setting the reference by manual mode (enter 100%)

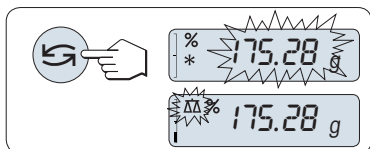
- 1 Press «←» to activate manual mode.
- 2 Select the reference target weight (100%) by scrolling up («+» key) or down («-» key). Speed up by press and hold.
- 3 Press «←» to confirm.



Setting possibility

B Setting the reference in weighing mode (weigh 100%)

- 1 Press «→0/T←» to zero/tare the balance and to activate the weighing mode. If needed: place empty container on the weighing pan and zero/tare again.
- 2 Load the reference weight (100%).
Note: Reference weight must be at least +/- 10d.
- 3 Press «←» to confirm.



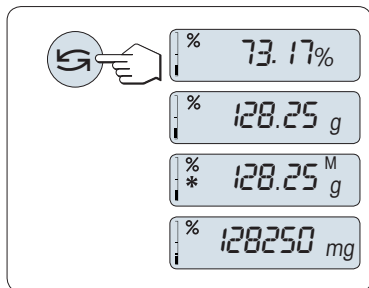
Switching between manual mode and weighing mode

- Press «↻» to switch between manual and weighing mode.

Note: By switching from weighing mode to manual mode the weight value will be transferred and can be changed manually.

Note: If without any key press within 60 seconds, the balance returns to the previous active application.

On completion of the weighing-in procedure, your balance is ready for percent weighing.



Switching between percent and weight display

You can use the «» key at any time to switch the display between percent display, weighing unit "**UNIT 1**", "**RECALL**" value (if activated) and weighing unit "**UNIT 2**" (if different from **UNIT 1**).

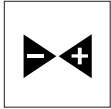
Note:

- The recall value is displayed with an asterisk (*) as well as icon "M" and can not be printed.
- The current set weight remains stored until it is redetermined.

Terminate the application

Press and hold «» to terminate the application and to return to the weighing application.

7.3 Application "Check Weighing"

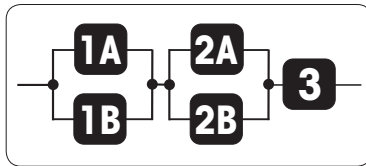


The **"Check weighing"** application allows you to check the deviation of a sample weight within a tolerance limit to a reference target weight.

Requirement: The function **"CHECK"** must be assigned to the «F» key (see advanced menu topic **"ASSIGN:F"**).



- Activate function **"CHECK"** by pressing and holding the «F» key.



Step 1: Check Weighing first requires the setting of a reference weight that should corresponds to the nominal weight, there are 2 possibilities:

1A Setting the reference **in manual mode** (enter nominal weight).

1B Setting the reference **in weighing mode** (weigh nominal weight).

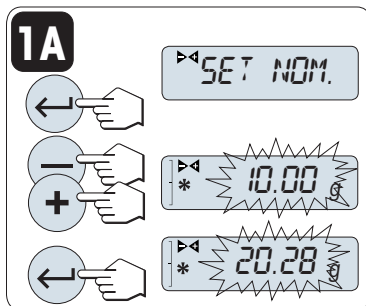
Step 2: Check weighing needs the upper and lower limits, there are 2 possibilities::

2A Setting the **upper and lower limits in percentage**.

2B Setting the **upper and lower limits by weight**.

Step 3: Setting tolerance beep

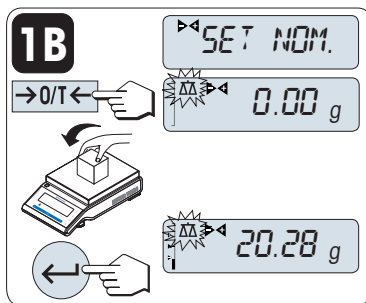
3 Activate or deactivate **tolerance beep**.



Setting possibility:

1A **Setting the reference in manual mode** (enter nominal weight)

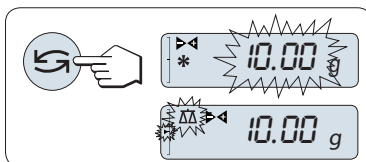
- 1 Press «←» to activate manual mode.
- 2 Select the reference target weight by scrolling up («+» key) or down («-» key). Speed up by press and hold.
- 3 Press «←» to confirm the nominal weight.



Setting possibility:

1B **Setting the reference in weighing mode** (weigh nominal weight)

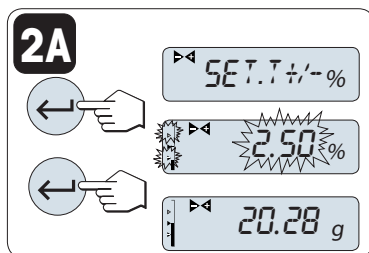
- 1 Press «→0/T←» to zero/tare the balance and to activate the weighing mode. If needed: place empty container on the weighing pan and zero/tare again.
- 2 Load the nominal weight.
- 3 Press «←» to confirm the nominal weight.



Switching between manual mode and weighing mode

- Press «↻» to switch between manual mode and weighing mode.

Note: By switching from weighing mode to manual mode the weight value will be transferred and can be changed manually.

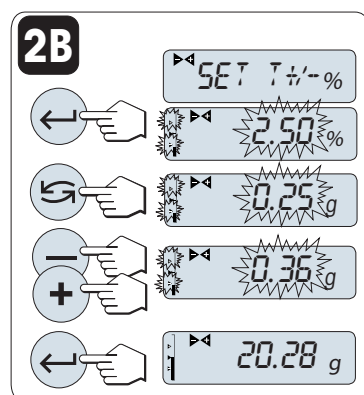


Step 2, setting possibility:

2A Setting the upper and lower limits (in percentage):

- 1 Press «←» to start setting.
- 2 Press «←» to confirm the default limit of +/- 2.5 % or enter the limit value by scrolling up («+» key) or down («-» key). Press «←» to confirm the limits.

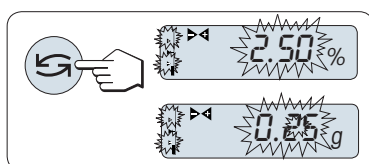
Note: Press «↶» to switch between "UNIT 1" and Unit "%".



Step 2, setting possibility:

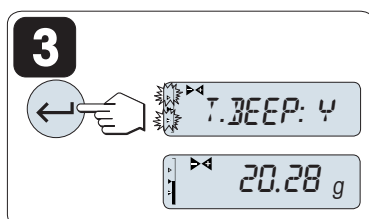
2B Setting the upper and lower limits by weight:

- 1 Press «←» to start setting.
- 2 Press «↶» to switch to **UNIT 1**.
- 3 Press «←» to confirm the default limit or enter the limit value by scrolling up («+» key) or down («-» key). Press «←» to confirm the limits.



Switching between percentage and weight unit 1

- Press «↶» to switch between setting in percentage and setting by weight.



Step 3:

3 Setting tolerance beep:

The tolerance beep indicates whether the weighing sample lies within the tolerance by beeping three times.

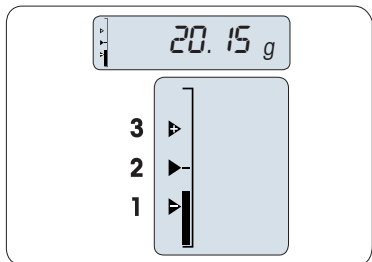
Note: The beep level corresponds to the setting in menu topic "STB.BEEP" (Basic menu). If "STB.BEEP" is set to "OFF", the tolerance beep level is medium.

- To activate tolerance beep press «←». To deactivate tolerance beep press «↶» to select "N" and press «←».

Note:

- If without any key press within 60 seconds, the balance returns to the previous active application. Press «C» to cancel and returns to the previous active application.
- The nominal weight must be at least 10 digit.

On completion of the setting procedure, your balance is ready for checkweighing.



Weighing-in-Aid

The Weighing-in-Aid helps you quickly determine the position of the sample weight regarding the tolerance.

- 1** Lower limit
- 2** Target weight
- 3** Upper limit

Terminate the application

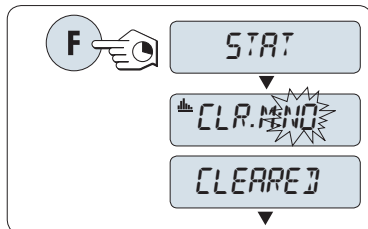
Press and hold «» to terminate the application and to return to the weighing application.

7.4 Application "Statistics"



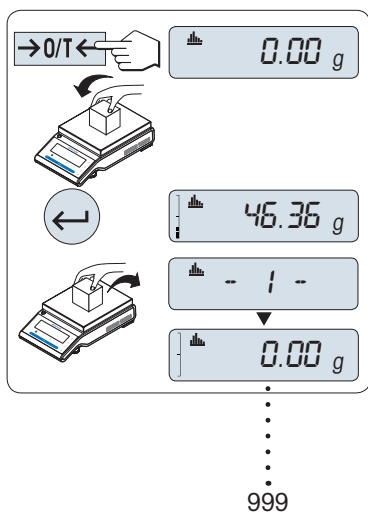
The "Statistics" application allows you to generate statistics of a series of weighing values. 1 to 999 values are possible.

Requirement: The function "STAT." must be assigned to the «F» key (see advanced menu topic "ASSIGN:F"). Connect a printer or a PC if present.



- 1 Activate function "STAT." by pressing and holding the «F» key.
- 2 To continue the last statistics press «←». For a new statistical evaluation press «↶» (or «+», «-») to select "CLR.M:YES" and press «←» to clear the memory.

Note: If the memory is already cleared (sample counter is 0) the memory clear question will be not displayed.



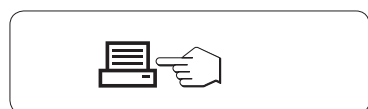
Weighing the first sample weight:

- 1 Press «→0/T←» to zero/tare the balance if needed.
- 2 Load the first sample weight.
- 3 Press «←». The display shows the sample count "- 1 -" and the current weight is stored as sample and the weight is printed out.
Note: When the sample counter is displayed you may press «C» to undo (drop) this sample.
- 4 Unload the first sample weight.

Weighing further sample weights:

The same procedure as for the first sample weight.

- 1...999 samples are possible.
- The next value will be accepted if the sample weight is in the range 70% –130% of the current average value. "OUT OF RANGE" will be displayed if the sample is not accepted.



Results:

- If the numbers of sample are greater than or equal to 2, press «», the results are displayed and printed.

Displayed results:

- 1 Press «←» to show the next statistical value.
- 2 Press «C» to cancel displaying results and to continue weighing next sample.

		0.5 seconds
number of samples	 N	→ * 5 ←
average	 X	→ * 50.530 g ←
standard deviation	 SDEV	→ * 3.961 g ←
relative standard deviation	 SREL	→ * 7.84 % ←
lowest value (minimum)	 MIN	→ * 46.36 g ←
highest value (maximum)	 MAX	→ * 55.81 g ←
different between the minimum and the maximum	 DIFF	→ * 9.45 g ←

Displayed results:

- 1 Press «» to show the next statistical value.
- 2 Press «» to cancel displaying results and to continue weighing next sample.

sum of all values

**Printout:**

----- Statistics -----	
21.Jan 2010	12:56
METTLER TOLEDO	
Balance Type	JP4002G
SNR	1234567890

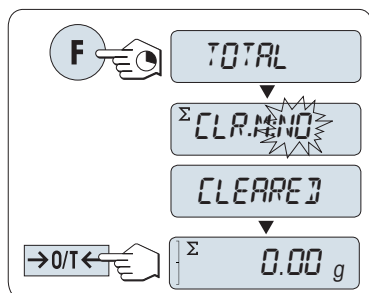
1	46.36 g
2	55.81 g
3	47.49 g
4	53.28 g
5	49.71 g
n	5
x	50.530 g
s dev	3.961 g
s rel	7.84 g
Min.	46.36 g
Max.	55.81 g
Diff	9.45 g
Sum	252.65 g

7.5 Application "Totaling"

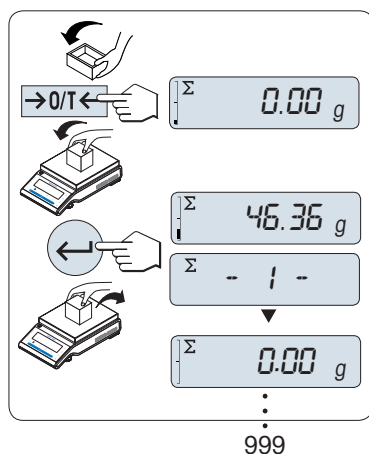


The **"TOTALING"** application allows you to weigh in different samples to add their weight values and to totalize them. 1 to 999 samples are possible.

Requirement: The function **"TOTAL"** must be assigned to the **«F»** key (see advanced menu topic **"ASSIGN:F"**).



- 1 Activate function **"TOTAL"** by pressing and holding the **«F»** key.
- 2 For a new totaling evaluation press **«CLR/M»** (or **«+»** or **«-»**) to enter **"CLR.M: YES"** and press **«CLR/M»** to clear the memory.
Note: If the memory is already cleared (sample counter is 0) the memory clear question will be not displayed.
- 3 Press **«→0/T←»** to zero or tare the balance.



Weighing in the sample weight:

- 1 If using a container: place empty container on the weighing pan and press **«→0/T←»** to zero or tare the balance.
- 2 Load the first sample weight.
- 3 Press **«CLR/M»**. The display shows the sample count **"- 1 -"** and the current weight is stored.
Note: When the sample counter is displayed you may press **«C»** to undo (drop) this sample.
- 4 Unload the first sample weight. The display shows zero.

Weighing in further sample weights:

The same procedure as for the first sample weight.

- 1...999 samples are possible.



Results:

- If the numbers of sample are greater than or equal to 2, press **«Print»**, the results are displayed and printed.

Displayed results:

- 1 Press **«CLR/M»** briefly to show the totaled value.
- 2 Press **«C»** briefly to cancel.

0.5 seconds

number of samples ΣN $\rightarrow$ Σ 879 $\leftarrow$

totalized value $\Sigma TOTAL$ $\rightarrow$ Σ 8789.79 g $\leftarrow$

Printout:

```
----- Totaling -----  
21.Jan 2010          12:56  
  
METTLER TOLEDO  
  
Balance Type      JP2002G  
SNR              1234567890  
-----  
1                46.36 g  
2                55.81 g  
3                47.49 g  
4                53.28 g  
5                49.71 g  
6                53.93 g  
.  
.  
.  
n                      879  
Total            8789.79 g  
-----
```

7.6 Application "Multiplication Factor Weighing"

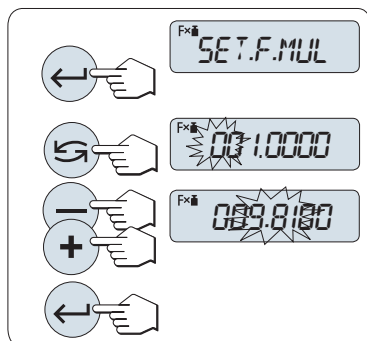


The "**Multiplication Factor Weighing**" application allows you to multiply the weight value (in grams) by a predefined factor (result = factor * weight) and have it calculated to a predefined number of decimal places.

Requirement: The function "**FACTOR.M**" must be assigned to the «F» key (see advanced menu topic "**ASSIGN:F**").



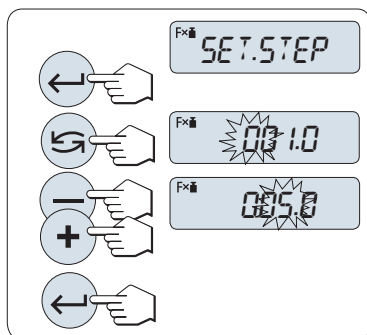
- Activate function "**FACTOR.M**" by pressing and holding the «F» key.



1 Setting the factor value:

- 1 Press «←» to execute "**SET.F.MUL**". Either the factor 1 appears as default value or the factor that was saved most recently.
- 2 Press «←» to select a digit. The selected digit is blinking.
- 3 For changing digits, press «+» to scroll up or «-» to scroll down.
- 4 Press «←» to confirm the selected factor (no automatic acceptance).

Note: Zero for multiplication factor value is outside the allowed range, the error message "**FACTOR OUT OF RANGE**" will be displayed.



2 Setting the step value:

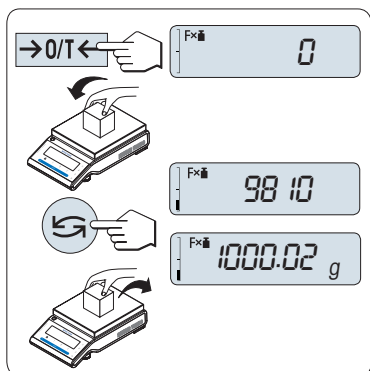
"**SET.STEP**" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.

- 1 Press «←» to execute "**SET.STEP**".
- 2 Press «←» to select a digit. The selected digit is blinking.
- 3 For changing digits, press «+» to scroll up or «-» to scroll down.
- 4 Press «←» to confirm the selected step (no automatic acceptance).

Note: The allowed range for the step depends on the factor and the resolution of the balance. If it is outside the allowed range the error message "**STEP OUT OF RANGE**" will be displayed.

Note: If without any key press within 60 seconds, the balance returns to the previous active application. Press «C» to cancel and returns to the previous active application.

On completion of the setting procedure, your balance is ready for multiplication factor weighing.



Weighing procedure

- 1 Press «→0/T←» to zero/tare.
- 2 Load sample weight on weighing pan.
- 3 Read the result. The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step.
Note: No units are displayed.
- 4 Unload sample weight.

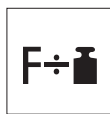
Toggling between displaying the calculated value and the measured weight:

You can use the «↺» key to toggle between the calculated Value, weight value "UNIT 1", "RECALL" value (if selected) and weight value "UNIT 2" (if different from "UNIT 1").

Terminate the application

Press and hold «ΔΔ» to terminate the application and to return to the weighing application.

7.7 Application "Division Factor Weighing"

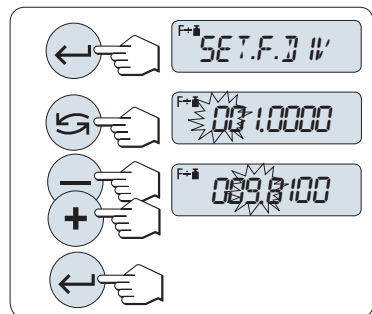


The "Division Factor Weighing" divide a predefined factor by the weight value (in grams) (result = factor / weight) and have it rounded to a predefined number of decimal places.

Requirement: The function "FACTOR.D" must be assigned to the «F» key (see advanced menu topic "ASSIGN:F").



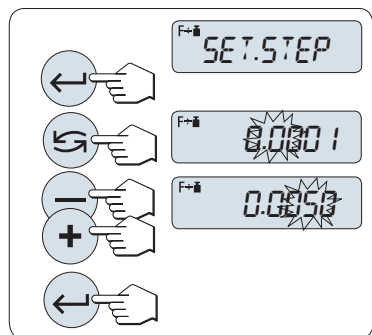
- Activate function "FACTOR.D" by pressing and holding the «F» key.



1 Setting the Factor Value:

- 1 Press «←» to execute "SET.F.DIV". Either the factor 1 appears as default value or the factor that was saved most recently.
- 2 Press «↶» to select a digit. The selected digit is blinking.
- 3 For changing digits, press «+» key to scroll up or «-» to scroll down.
- 4 Press «←» briefly to confirm the selected factor (no automatic acceptance).

Note: Zero for division factor value is outside the allowed range, the error message "FACTOR OUT OF RANGE" will be displayed.



2 Setting the step value:

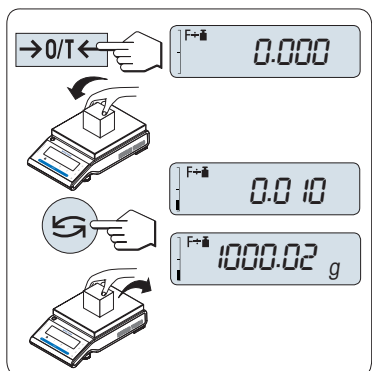
"SET.STEP" appears in the display, and the program changes automatically to allow the display increments to be entered. The smallest possible display increment appears as default value, or the last value that was saved.

- 1 Press «←» to execute "SET.STEP".
- 2 Press «↶» to select a digit. The selected digit is blinking.
- 3 For changing digits, press «+» to scroll up or «-» to scroll down.
- 4 Press «←» to confirm the selected step (no automatic acceptance).

Note: The allowed range for the step depends on the factor and the resolution of the balance. If it is outside the allowed range the error message "STEP OUT OF RANGE" will be displayed.

Note: If without any key press within 60 seconds, the balance returns to the previous active application. Press «C» to cancel and returns to the previous active application.

On completion of the setting procedure, your balance is ready for division factor weighing.



Weighing procedure

- 1 Press «→0/T←» to zero/tare.
- 2 Load sample weight on weighing pan.
- 3 Read the result. The appropriate calculation is then made using the weight of sample and the selected factor, the result being displayed with the selected display step.
Note: No units are displayed. To avoid a division by zero, the factor division is not calculated at zero.
- 4 Unload sample weight.

Toggling between displaying the calculated value and the measured weight:

You can use the «↶» key to toggle between the calculated Value, weight value "UNIT 1", "RECALL" value (if selected) and weight value "UNIT 2" (if different from "UNIT 1").

Terminate the application

Press and hold «ΔΔ» to terminate the application and to return to the weighing application.

7.8 Application "Density"

Note: This Application is only available with JP models.



The **"Density"** application allows you to determine the density of solid bodies and liquids. Determination of the density uses **Archimedes' principle** according to which a body immersed in a fluid undergoes an apparent loss in weight which is equal to the weight of the fluid it displaces.

To determine the density of solid bodies, we recommend you to work with the optional density kit which contains all the attachments and aids needed for convenient and precise density determination. To determine the density of liquids, you additionally need a sinker which you can also obtain from your METTLER TOLEDO dealer.

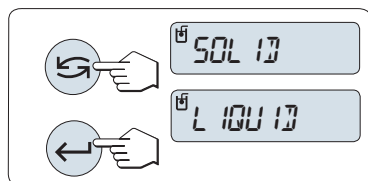
Note for performing of density determinations:

- You can also use the hanger for weighing below the balance which belongs to your balance.
- We recommend you to consult the operating instructions enclosed with the density kit.
- If a METTLER TOLEDO printer is attached to your balance, the settings will be automatically recorded.

Requirement: The function **"DENSITY"** must be assigned to the **«F»** key (see advanced menu topic **"ASSIGN:F"**). Density kit is installed.

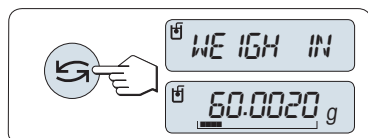


- Activate function **"DENSITY"** by pressing and holding the appropriate assigned **«F»** key.



Setting the method for density determination

- 1 Select:
"SOLID", the function for the density determination of solids, or
"LIQUID", the function for the density determination of liquids with a sinker.
- 2 Press **«←»** to confirm the selection

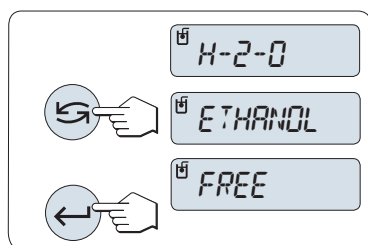


Switching the display between user guidance and weighing

- Press **«→»** to toggle the display between user guidance and weighing.

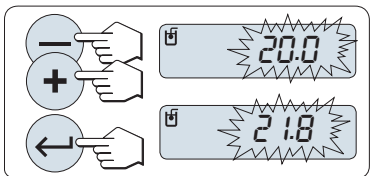
7.8.1 Density Determination of Solids

Requirement: The method **"SOLID"** is set.



Setting the parameter of the auxiliary liquid

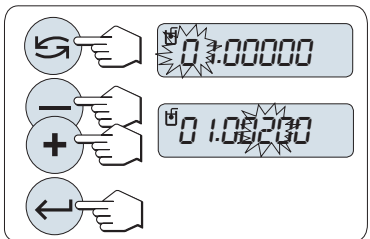
- 1 Select the auxiliary liquid by scrolling with **«→»** (or **«-»** up / **«+»** down):
"H-2-O" for distilled water, **"ETHANOL"** or **"FREE"** for a freely definable auxiliary liquid.
- 2 Press **«←»** to confirm the selection.



If you have selected water or ethanol as the auxiliary liquid:

- 1 Enter the current temperature of the auxiliary liquid (read off on thermometer). Change the value by scrolling up «+» or down «-». The temperature ranges from 10 °C to 30.9 °C.
- 2 Press «←» to confirm the value.

Note: The densities of distilled water and ethanol in the range 10 °C to 30.9 °C are stored in the balance.



If you have selected a freely definable auxiliary liquid:

Enter the density of the auxiliary liquid at the current temperature (read off on thermometer).

- 1 Press «←» to select a digit. The selected digit is blinking.
- 2 For changing digits, press «+» to scroll up or «-» to scroll down.
- 3 Press «←» to confirm the selected value.

Note: If without any key press within 60 seconds or by pressing «C», the balance returns to the previous active application.

On completion of the settings, your balance is ready for performing the density determination of liquids.

Note: Taring the balance is possible at any time.



The balance prompts you: **"PRESS ENTER TO START"**.

- Press «←» to start. Tare/Zero is executed.



The balance prompts you to weigh the solid in air **"WEIGH IN AIR"**.

- 1 Load the solid.
- 2 Press «←» to initiate the measurement.



The balance prompts you to weigh the solid in the auxiliary liquid **"WEIGH IN LIQUID"**.

- 1 Load the solid.
- 2 Press «←» to initiate the measurement.



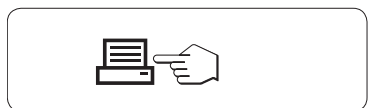
The balance now shows the determined density of the solid in g/cm³.

Note:

- This result has already been corrected for the air buoyancy. The buoyancy caused by the two immersed wires (Ø 0.6 mm) can be neglected.
- By pressing «C», the balance returns to **"PRESS ENTER TO START"**.

Result:

Press «», the result will be printed.



Sample printout:

```
----- Density Solid -----
18.Mar 2010          20:14
Balance Type        JP703C
SNR                 1234567890
-----

ID:      .....

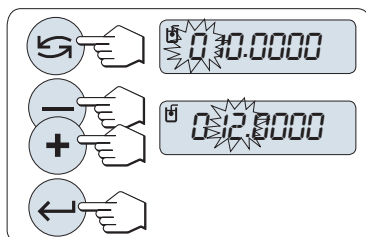
Liquid:
H-2-O      0.99822 g/cm3
Temp.      20.0 °C
Weight in air:
           60.0020 g
Weight in liquid:
           49.9997 g
Volume of solid:
           1.625 cm3

Density:      5.988 g/cm3
           =====

Signature
.....
-----
```

7.8.2 Density Determination of Liquids

Requirement: The method "**LIQUID**" is set.



Setting the displacement volume of your sinker

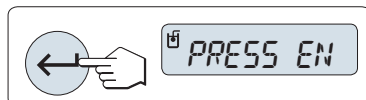
Press «←» to confirm the default value of 10.0 cm³ or change it if needed:

- 1 Press «←» to select a digit. The selected digit is blinking.
- 2 For changing digits, press «+» to scroll up or «-» to scroll down
- 3 Press «←» to confirm the selected value.

Note: If without any key press within 60 seconds or by pressing «C», the balance returns to the previous active application.

On completion of the settings, your balance is ready for performing the density determination of liquids.

Note: Taring the balance is possible at any time.



The balance prompts you: "**PRESS ENTER TO START**".

- Press «←» to start.



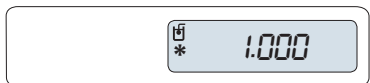
The balance prompts you to weigh the sinker in air "**WEIGH IN AIR**".

- 1 Position the sinker.
- 2 Press «←» to initiate the measurement.



The balance prompts you to weigh the sinker in the liquid "**WEIGH IN LIQUID**".

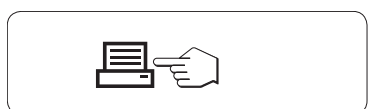
- 1 Pour the liquid into the beaker. Make sure that the sinker is immersed by at least 1 cm in the liquid, and that there are no air bubbles in the container.
- 2 Press «←» to initiate the measurement.



The balance now shows the determined density of the liquid at the current temperature (read off on the thermometer).

Note:

- This result has already been corrected for the air buoyancy. The buoyancy caused by the immersed wire (Ø 0.2 mm) of the sinker can be neglected.
- By pressing «C», the balance returns to "**PRESS ENTER TO START**".



Result:

Press «», the result will be printed.

Sample printout:

```

---- Density Liquid ----
18.Mar 2010          20:14
Balance Type      JP703C
SNR              1234567890
-----

ID:      .....

Temp. of liquid:
          .....

Displaced liquid:
          10.0023 g

Density:    1.000 g/cm3
          =====

Signature

          .....
          -----
  
```

7.8.3 Formulae Used to Calculate Density

The "**DENSITY**" Application is based on the formulae listed below.

Formulae for determining the density of solids with compensation for air density

$$\rho = \frac{A}{A-B} (\rho_0 - \rho_L) + \rho_L$$

$$V = \alpha \frac{A - B}{\rho_0 - \rho_L}$$

ρ = Density of the sample

- A = Weight of the sample in air
 B = Weight of the sample in the auxiliary liquid
 V = Volume of the sample
 ρ_0 = Density of the auxiliary liquid
 ρ_L = Density of Air (0.0012 g/cm³)
 α = Weight correction factor (0.99985), to take the atmospheric buoyancy of the adjustment weight into account

Formula for determining the density of liquids with compensation for air density

$$\rho = \alpha \frac{P}{V} + \rho_L$$

- ρ = Density of the liquid
 P = Weight of the displaced liquid
 V = Volume of the sinker
 ρ_L = Density of air (0.0012 g/cm³)
 α = Weight correction factor (0.99985), to take the atmospheric buoyancy of the adjustment weight into account

Density Table for Distilled Water

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.99973	0.99972	0.99971	0.99970	0.99969	0.99968	0.99967	0.99966	0.99965	0.99964
11.	0.99963	0.99962	0.99961	0.99960	0.99959	0.99958	0.99957	0.99956	0.99955	0.99954
12.	0.99953	0.99951	0.99950	0.99949	0.99948	0.99947	0.99946	0.99944	0.99943	0.99942
13.	0.99941	0.99939	0.99938	0.99937	0.99935	0.99934	0.99933	0.99931	0.99930	0.99929
14.	0.99927	0.99926	0.99924	0.99923	0.99922	0.99920	0.99919	0.99917	0.99916	0.99914
15.	0.99913	0.99911	0.99910	0.99908	0.99907	0.99905	0.99904	0.99902	0.99900	0.99899
16.	0.99897	0.99896	0.99894	0.99892	0.99891	0.99889	0.99887	0.99885	0.99884	0.99882
17.	0.99880	0.99879	0.99877	0.99875	0.99873	0.99871	0.99870	0.99868	0.99866	0.99864
18.	0.99862	0.99860	0.99859	0.99857	0.99855	0.99853	0.99851	0.99849	0.99847	0.99845
19.	0.99843	0.99841	0.99839	0.99837	0.99835	0.99833	0.99831	0.99829	0.99827	0.99825
20.	0.99823	0.99821	0.99819	0.99817	0.99815	0.99813	0.99811	0.99808	0.99806	0.99804
21.	0.99802	0.99800	0.99798	0.99795	0.99793	0.99791	0.99789	0.99786	0.99784	0.99782
22.	0.99780	0.99777	0.99775	0.99773	0.99771	0.99768	0.99766	0.99764	0.99761	0.99759
23.	0.99756	0.99754	0.99752	0.99749	0.99747	0.99744	0.99742	0.99740	0.99737	0.99735
24.	0.99732	0.99730	0.99727	0.99725	0.99722	0.99720	0.99717	0.99715	0.99712	0.99710
25.	0.99707	0.99704	0.99702	0.99699	0.99697	0.99694	0.99691	0.99689	0.99686	0.99684
26.	0.99681	0.99678	0.99676	0.99673	0.99670	0.99668	0.99665	0.99662	0.99659	0.99657
27.	0.99654	0.99651	0.99648	0.99646	0.99643	0.99640	0.99637	0.99634	0.99632	0.99629
28.	0.99626	0.99623	0.99620	0.99617	0.99614	0.99612	0.99609	0.99606	0.99603	0.99600
29.	0.99597	0.99594	0.99591	0.99588	0.99585	0.99582	0.99579	0.99576	0.99573	0.99570
30.	0.99567	0.99564	0.99561	0.99558	0.99555	0.99552	0.99549	0.99546	0.99543	0.99540

Density Table for Ethanol

T/°C	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10.	0.79784	0.79775	0.79767	0.79758	0.79750	0.79741	0.79733	0.79725	0.79716	0.79708
11.	0.79699	0.79691	0.79682	0.79674	0.79665	0.79657	0.79648	0.79640	0.79631	0.79623
12.	0.79614	0.79606	0.79598	0.79589	0.79581	0.79572	0.79564	0.79555	0.79547	0.79538
13.	0.79530	0.79521	0.79513	0.79504	0.79496	0.79487	0.79479	0.79470	0.79462	0.79453
14.	0.79445	0.79436	0.79428	0.79419	0.79411	0.79402	0.79394	0.79385	0.79377	0.79368
15.	0.79360	0.79352	0.79343	0.79335	0.79326	0.79318	0.79309	0.79301	0.79292	0.79284
16.	0.79275	0.79267	0.79258	0.79250	0.79241	0.79232	0.79224	0.79215	0.79207	0.79198
17.	0.79190	0.79181	0.79173	0.79164	0.79156	0.79147	0.79139	0.79130	0.79122	0.79113
18.	0.79105	0.79096	0.79088	0.79079	0.79071	0.79062	0.79054	0.79045	0.79037	0.79028
19.	0.79020	0.79011	0.79002	0.78994	0.78985	0.78977	0.78968	0.78960	0.78951	0.78943
20.	0.78934	0.78926	0.78917	0.78909	0.78900	0.78892	0.78883	0.78874	0.78866	0.78857
21.	0.78849	0.78840	0.78832	0.78823	0.78815	0.78806	0.78797	0.78789	0.78780	0.78772
22.	0.78763	0.78755	0.78746	0.78738	0.78729	0.78720	0.78712	0.78703	0.78695	0.78686
23.	0.78678	0.78669	0.78660	0.78652	0.78643	0.78635	0.78626	0.78618	0.78609	0.78600
24.	0.78592	0.78583	0.78575	0.78566	0.78558	0.78549	0.78540	0.78532	0.78523	0.78515
25.	0.78506	0.78497	0.78489	0.78480	0.78472	0.78463	0.78454	0.78446	0.78437	0.78429
26.	0.78420	0.78411	0.78403	0.78394	0.78386	0.78377	0.78368	0.78360	0.78351	0.78343
27.	0.78334	0.78325	0.78317	0.78308	0.78299	0.78291	0.78282	0.78274	0.78265	0.78256
28.	0.78248	0.78239	0.78230	0.78222	0.78213	0.78205	0.78196	0.78187	0.78179	0.78170
29.	0.78161	0.78153	0.78144	0.78136	0.78127	0.78118	0.78110	0.78101	0.78092	0.78084
30.	0.78075	0.78066	0.78058	0.78049	0.78040	0.78032	0.78023	0.78014	0.78006	0.77997

Density of C₂H₅OH according to the "American Institute of Physics Handbook".

7.9 Application "Routine Test"



The "**Routine Test**" application allows you to determine the sensitivity of the balance. More about periodic sensitivity tests (routine tests) see: **GWP®** (Good Weighing Practice) on www.mt.com/gwp.

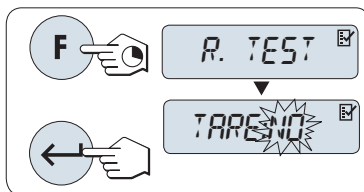
GWP gives clear recommendation for routine testing:

- how should I test my balance?
- how often?
- where can I reduce efforts?

More about test weights see www.mt.com/weights.

Requirement:

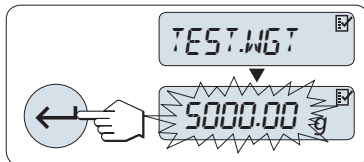
- The function "**R.TEST**" must be assigned to «**F**» key (see advanced menu topic "**ASSIGN:F**").
- It is recommended to connect a printer or a PC to the balance for showing the results.



- 1 Activate function "**R.TEST**" by pressing and holding the assigned «**F**» key.
- 2 Select "**TARE:NO**" (no tare weight used).
If a tare weight is used during the test select "**TARE:YES**" (use a tare weight). To toggle between "**TARE:YES**" and "**TARE:NO**" use «**↔**» (or «**+**» or «**-**»).
- 3 Press «**←**» to confirm the selection.

Note:

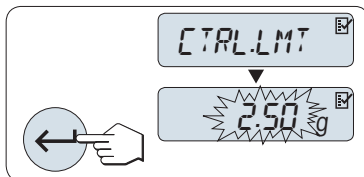
- It is recommended to test the sensitivity without tare load. (factory setting "**TARE:NO**").
- If using tare: Make sure that tare weight plus test weight is not exceeding max. load.



Setting the reference test weight value

The default value of the test weight: Next smaller OIML weight than the maximum load of your balance according to the GWP® recommendation.

- 1 For changing the value, press «**+**» to scroll up or «**-**» to scroll down. Progressing speed by press and hold.
- 2 Press «**←**» to confirm the value.



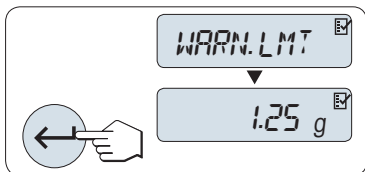
Setting the Control Limit

The default value of the control limit:

Test weight x weighing process tolerance / 2

Example: 5000 g x 0.1% / 2 = 2.50 g.

- 1 For changing the value, press «**+**» to scroll up or «**-**» to scroll down. Progressing speed by press and hold.
- 2 Press «**←**» to confirm the value.



Setting the Warning Limit

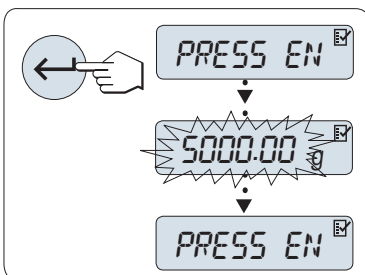
The default value of the warning limit:

Warning limit = control limit / safety factor

Example: $2.5 \text{ g} / 2 = 1.25 \text{ g}$.

- 1 For changing the value, press «+» to scroll up or «-» to scroll down. Progressing speed by press and hold.
- 2 Press «←» to confirm the value.

Note: The default values of control limit and the warning limit are evaluated according the GWP recommendation. These are based under the assumption that the weighing process tolerance is 0.1% and the safety factor is 2.



On completion of the setting procedure, your balance is ready for the routine test procedure.

Note: The test weight must be acclimatized to the ambient temperature of the balance.

- 1 Press «←» to start the test.
- 2 Follow the instructions on the display. If the test weight value is flashing: Load the test weight (displayed value).

The printout starts after the weighing pan is unloaded.

Exit the current test procedure:

- Press and hold « $\Delta\Delta$ » for executing a new application.

Printout:

```

----- Routine Test -----
21.Jan 2010          12:56

METTLER TOLEDO

Balance Type      JP6002G
SNR               1234567890

Sensitivity:
Test weight      5000.00 g
Value            5000.11 g
Warning L.       1.25 g
Control L.       2.50 g
Warning L.       OK
Control L.       OK

Signature
.....
-----

```

What if Warning Limit or Control Limit are "FAILED"?

The "SOP for Periodic Sensitivity Tests (Routine Tests)" provides information about measures when routine tests fail. Find a download version of these SOPs on www.mt.com/gwp, link "**GWP® The Program / Routine Operation**".

Content of SOP:

- Preparation
- Test procedure

- Evaluation
- Deviation
 - If Warning Limit "**FAILED**"
 - If Control Limit "**FAILED**"

7.10 Application "Diagnostics"



The "**Diagnostics**" application allows you to carry out predefined diagnostics tests and to view or print predefined sets of balance information. This diagnostics tool helps you find errors faster and more efficiently.

Requirement: A printer or a PC is connected to the balance for showing the results.

- 1 Activate "**ADVANCE.**" menu. (See section menu operation)
- 2 Activate function "**DIAGNOS.**" by pressing «».
- 3 Use «» to select appropriate tests.

7.10.1 Repeatability Test

The repeatability test allows you to repeat tests with internal weight for a given number of times.

Note: On models with internal weights only.

- 1 Press «» to activate repeatability test "**REPEAT.T**". "**R.TST. 10**" appears on the Display.
- 2 Enter the number of times (blinking) by pressing «**+**» or «**-**». Possible values are 5, 10 (default), 20, 50, 100 times.
- 3 Press «» to start the test. The message "**RUNNING REPEAT TEST**" is displayed till the tests are completed.
- 4 Press «» to print the test information..
- 5 Press «» to scroll forward through the displayed list.
- 6 Press «**C**» to cancel the test procedure. The balance will return to the topic "**DIAGNOS.**".

Sample Information Displayed:

Displayed for 0.5 s	Display
"S DEV"	* 0.004 g
"MAX.TEMP"	21.2 °C
"MIN.TEMP"	21.0 °C
"AVG.TEMP"	21.1 °C
"TOT.TIME"	00:01:26

Sample Printout:

```
-- Repeatability Test --
21.Jan 2010      11:34

METTLER TOLEDO

Balance Type      JP4002G
SNR               1234567890
SW               V1.00
Temperature       21.3 °C
No. of tests      10
-----
1. Time          00:00:00
1. Temp          21.3 °C
2. Time          00:00:04
2. Temp          21.3 °C
.
.
.
-----
s Dev            0.004 g
Max Temp         21.3 °C
Min Temp         21.3 °C
Mean Temp        21.3 °C
Total Time       00:00:44
-----
```

Examples:

Repeatability test is a tool to do functional check with the balance. It may be performed:

- **To check function of balance**
 - during installation to store print out with installation documents.
 - after preventative maintenance to store print out with installation maintenance report.
 - when remarkable decrease of weighing performance occurs, so that you can email/fax print out to service support provider for diagnose purposes.
- **To develop the optimal environment settings** (see menu topic "**ENVIRON.**").
Measure the time you need to perform repeatability test with each "**STABLE**", "**STD.**" and "**UNSTAB.**" setting.
The setting with the fastest total time suits best for the existing environmental conditions.

7.10.2 Display Test

The display test allows you to test the display of the balance.

- 1 Press «» to start "**DISPLAY**".
All possible segments and icons on the display will illuminate.
- 2 Press «» to print the test information.
- 3 Press «**C**» to cancel the test procedure. The balance will return to the topic "**DIAGNOS.**".

Sample Printout:

```
----- Display Test -----
21.Jan 2010      11:34

METTLER TOLEDO

Balance Type      JP703C
SNR               1234567890
SW               V1.00
Display Test      DONE
-----
```

7.10.3 Key Test

The key test allows you to test the keys of the balance.

- 1 Press «» to start "**KEYPAD.T**".
- 2 The message "**KEY TEST - PRESS KEY TO BE TESTED**" is displayed scrolling during the duration of the key test. Press every Key briefly. Each press of a key beeps and echoes with "**OK**" on the display.
- 3 Second press «**C**» key to print the test information. The test procedure will be cancelled and the balance will return to the topic "**DIAGNOS.**". If a key has not been tested before printing, then the test results will be indicated with a "----" line.

Sample Information Displayed:

Key	Display
«  »	1/10.D.OK
«  »	PRINT.OK
«  »	MINUS.OK
«  »	PLUS OK
«  »	TOGGL.OK
«  »	ENTER.OK
« C »	C OK
«  »	0/T OK

Sample Printout:

```
----- Key Test -----
21.Jan 2010      11:34

METTLER TOLEDO

Balance Type      JP703C
SNR               1234567890
SW               V1.00
1/10 d Key       OK
Print Key        OK
Minus Key        OK
Plus Key         OK
Toggle Key       OK
Enter Key        OK
Zero/Tare Key    OK
Cancel Key       OK
-----
```

7.10.4 Motor Test

The motor test allows you to test the calibration motor of the balance.

Note: On models with internal weight only.

- 1 Press «» to start "**CAL.MOT.T**".
"RUNNING" is displayed during the Motor Test. A motor test is deemed successful when all the motor positions have been successfully tested. At the end of the test, the test information will be printed.
- 2 Press «» for printout.
- 3 Press «**C**» to cancel the test procedure. The balance will return to the topic "**DIAGNOS.**".

Sample Printout:

```
----- Motor Test -----  
21.Jan 2010      11:34  
  
METTLER TOLEDO  
  
Balance Type      JP703C  
SNR               1234567890  
SW               V1.00  
Motor Test        OK  
-----
```

7.10.5 Balance History

The balance history function allows you to view and print the history of the balance.

- 1 Press «» to start "**BAL.HIST**".
- 2 Press «» to scroll forward through the displayed list of balance history information.
- 3 Press «» for printout.
- 4 Press «**C**» to cancel the test procedure. The balance will return to the topic "**DIAGNOS.**".

Sample Information Displayed:

Information	Display
Operation Time (year:day:hour)	00:018:04
Total load kg (t)	115.7191 kg
Number of weighings	1255
Number of key pressed	4931
Number of motor movements	1012
Backlight time (year:day:hour)	00:018:04
Next service due date	01:01:10

Sample Printout:

```
--- Statistical Info ---
21.Jan 2010      11:34

METTLER TOLEDO

Balance Type      JP4002G
SNR               1234567890
SW               V1.00
-----
Operating time    18d 23h
Total weight loaded
                  115.7191 kg
Number of weighings
                  1255
Number of key presses
                  4931
Motor movements   1012
Backlight operating time
                  18d 4h
Next service due date
                  01.01.2010
-----
```

7.10.6 Calibration History

The "Calibration History" function allows you to view and print information of the last 30 (thirty) balance adjustment. Adjustments made by a service technician and normal user are counted together.

- 1 Press «» to start "**CAL.HIST**".
- 2 Press «» for printout.
- 3 Press «» key to scroll forward through the displayed list of Adjustments history information.
- 4 Press «**C**» to cancel the test procedure. The balance will return to the topic "**DIAGNOS.**".

Sample Information Displayed:

Note	Display	
S = External adjusted service	05:03:S	01
	-3 PPM	
I = Internal adjusted	04:03:I	02
	2 PPM	
	.	.
	.	.
	.	.
I = Internal adjusted	03:03:I	28
	-1 PPM	
E = External adjusted user	02:03:E	29
	4 PPM	
I = Internal adjusted	02:03:I	30
	1 PPM	

Sample Printout:

```
----- Calibration -----
05.Mar 2010      11:34

METTLER TOLEDO

Balance Type      JP204C
SNR               1234567890
-----
01 05.Mar 2010    11:34
External ADJ SERVICE
                  23.5°C
Diff              -3ppm
-----
02 04.Mar 2010    09:00
Internal ADJ
                  22.4°C
Diff              2ppm
-----
.
.
.
28 03.Mar 2010    10:59
Internal ADJ
                  22.6°C
Diff              -1ppm
-----
29 02.Mar 2010    16:34
External ADJ USER
                  24.6°C
Diff              4ppm
-----
30 02.Mar 2010    18:36
Internal ADJ
                  22.4°C
Diff              1ppm
-----
```

7.10.7 Balance Information

The balance information function allows you to view and print information about your balance.

- 1 Press «» to start "**BAL.INFO**".
- 2 Press «» for printout.
- 3 Press «» to scroll forward through the displayed list of Balance information.
- 4 Press «**C**» to cancel the test procedure. The balance will return to the topic "**DIAGNOS.**".

Sample information displayed:

Information	Display
Balance type	TYPE ML4002
Max. load	MAX 4200 g
Software platform	PLATFORM RAINBOW
Serial number	SNR 1234567890
Type definition number	TDNR 9.6.3.411
Software version	SOFTWARE V1.00
Cell ID	CELL ID 1172400044
Cell type	CELL TYPE MMAI4000G2

Information	Display
Tolerance revision number	TOLERANCE NO2
Language	ENGLISH

Sample Printout:

```
-- Balance Information -
05.Mar 2010      11:34

METTLER TOLEDO

Balance Type      JP4002G
SNR               1234567890
SW               V1.00
Max. Load       4200 g
Platform         Rainbow
TDNR             9.6.3.411
Cell ID          1172400044
Cell Type        MMAI4000G2
Tolerance Rev.no. 2
Language         English
-----
```

7.10.8 Service Provider Information

The service provider Information function allows you to print information about your service provider.

- 1 Press «» to start "**SRV.PROV**". The service provider information will be displayed.
- 2 Press «». The service provider information will be printed and the balance will return to the topic "**DIAG-NOS.**".

Sample Printout:

```
--- Service Provider ---
21.Jan 2009      11:34

METTLER TOLEDO
Im Langacher
CH-8606 Greifensee
Switzerland
(+41) 044 944 22 11
-----
```

8 Communication with Peripheral Devices

8.1 Function PC-Direct

The numerical value displayed at the balance can be transferred to the cursor position in Windows Applications (e.g. Excel, Word) as by typing with the keyboard.

Note: The units will not be transferred.

Requirements

- PC with one of the Microsoft Windows® operating system 32bit/64bit: XP (SP3), Vista (SP2), Win 7 (SP1) or Win 8.
- Serial interface RS232 or USB.
- Administrator rights for installing software (for USB not required).
- Windows Application (e.g. Excel).
- Balance to PC connection with cable RS232 or USB.

Settings at the balance:

Attention

- DISCONNECT THE USB CONNECTION FROM THE BALANCE PRIOR TO CHANGE THE SETTINGS.
- USB does not work with keyboards where the "Shift" key must be pressed for entering numbers.

Balance Interface Settings (see Interface Menu):

- Topic "**RS232**" or "**USB**": set "**PC-DIR.**" and select the most appropriate option for the desired weighing result.
- Topic "**RS.TX.E.O.L.**"/"**RS E.O.L.**" or "**USB E.O.L.**"/"**USB E.O.L.**":
 - set **<TAB>** to write into the same row (e.g. in Excel).
 - set **<CR><LF>** to write into the same column (e.g. in Excel).
- Save changes.

Settings at the PC:

Installing SerialPortToKeyboard

Operation of PC-Direct via serial port RS232 requires the installation of **SerialPortToKeyboard** on your host computer.

Using CD-ROM

- 1 Insert the product CD in the CD/DVD drive of the host computer.
- 2 Double click the folder **SerialPortToKeyboard**.

Using internet

- 1 Go to the site <http://www.mettler-toledo-support.com>.
- 2 Log in to the METTLER TOLEDO Balance Support Site (registration with the serial number of a METTLER TOLEDO instrument required).
- 3 Click **Customer Support**
- 4 Click appropriate product folder and save the program file **SerialPortToKeyboard.exe** on your specified storage location.

Installing procedure

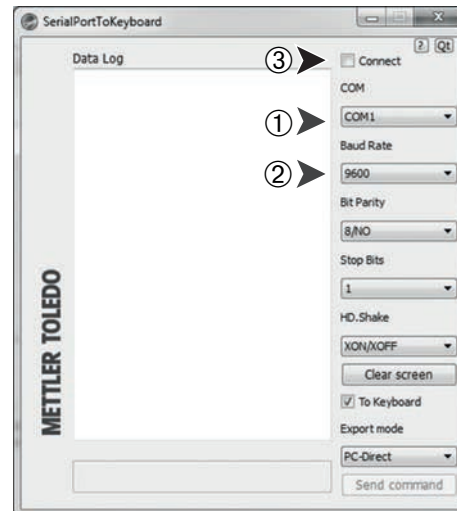
- 1 Right-click on **SerialPortToKeyboard.exe** and select **Run as Administrator** from the menu.
- 2 Follow the installer's instructions.

Settings for SerialPortToKeyboard

- 1 Select the serial port (COM) to be used for connection with the balance.
- 2 Set the baud rate to 9600.
- 3 Activate "Connect"

Note

- The window can be minimized.
- Closing of the window terminates the session.



Checking Operation

- 1 Start **SerialPortToKeyboard** (RS232)
- 2 Start Excel (or another application) at the PC.
- 3 Activate a cell in Excel.

According to your selected "**PC-DIR.**" option, the displayed values will appear e.g. in the column one after the other one in the different rows.

9 Firmware (Software) Updates

METTLER TOLEDO is continuously improving its balance firmware (software) for the benefit of customers, so that the customer can benefit quickly and easily from further developments, METTLER TOLEDO makes the latest firmware versions available on the Internet. The firmware made available on the Internet has been developed and tested by Mettler-Toledo AG using processes that meet the guidelines of ISO 9001. Mettler-Toledo AG does not, however, accept liability for consequences that might arise from using the firmware.

9.1 Operating Principle

You will find all the relevant information and updates for your balance on the METTLER TOLEDO website at the following address:

www.mettler-toledo-support.com

A program known as the "**e-Loader II**" is loaded onto your computer together with the firmware update. You can use this program to download the firmware to the balance. The "e-Loader II" can also save the settings in your balance before the new firmware is downloaded to it. You can reload the saved settings into the balance manually or automatically after the software is downloaded.

If the selected update includes an application that is not described in these instructions (or that has been updated in the meantime) you can download the corresponding instructions in Adobe Acrobat® PDF format.

Note

New applications might not be visible unless the type data are updated by a service technician.

Requirements

The minimum requirements for obtaining applications from the Internet and downloading them into your balance are as follows:

- PC with one of the following Microsoft Windows® operating system:
 - Microsoft® Windows® XP Home or Professional with Service Pack 3 (32 bit)
 - Microsoft® Windows Vista® Home Premium, Business, Ultimate, or Enterprise with Service Pack 2 (32 bit and 64 bit)
 - Microsoft® Windows 7 with Service Pack 1 Home Premium, Professional, Ultimate, or Enterprise (32 bit and 64 bit)
- Administrator rights for installing software.
- PC to balance connection cable (e.g. No. 11101051 see chapter accessories)

9.2 Update Procedure

Installing the "e-Loader II" software from the Internet onto the PC.

- 1 Connect to the Internet.
- 2 Go to the site <http://www.mettler-toledo-support.com>.
- 3 Log in to the **METTLER TOLEDO Balance Support Site** (registration with the serial number of a METTLER TOLEDO instrument required).
- 4 Click **Customer Support**.
- 5 Click appropriate product folder.
- 6 Click the firmware version (e-Loader II) you need and save it on your specified storage location.
- 7 Right-click on the **firmware SNxxx.exe** and select **Run as Administrator** from the menu.
- 8 Follow the installer's instructions.

Loading the new firmware into the balance.

- 1 Right-click on **METTLER TOLEDO e-Loader II** and select Run as Administrator from the menu.
- 2 Follow the instructions, which will take you step-by-step through the installation.

10 Error and Status Messages

10.1 Error Messages

Error messages in the display draw your attention to incorrect operation or that the balance could not execute a procedure properly.

Error Message	Cause	Rectification
NO STABILITY	No stability.	Ensure more stable ambient conditions. If not possible, check settings for environment.
WRONG ADJUSTMENT WEIGHT	Wrong adjustment weight on pan or none at all.	Place required adjustment weight in center of pan.
REFERENCE TOO SMALL	Reference for piece counting too small.	Increase reference weight.
EEPROM ERROR - PLEASE CONTACT CUSTOMER SERVICE	- EEPROM (memory) error. - Excessive mains voltage fluctuation or strong glitches occurred.	Please contact METTLER TOLEDO customer service.
WRONG CELL DATA - PLEASE CONTACT CUSTOMER SERVICE	Wrong cell data.	Please contact METTLER TOLEDO customer service.
NO STANDARD ADJUSTMENT - PLEASE CONTACT CUSTOMER SERVICE	No standard calibration.	Please contact METTLER TOLEDO customer service.
PROGRAM MEMORY DEFECT - PLEASE CONTACT CUSTOMER SERVICE	Program memory defect.	Please contact METTLER TOLEDO customer service.
TEMP SENSOR DEFECT - PLEASE CONTACT CUSTOMER SERVICE	Temperature sensor defect.	Please contact METTLER TOLEDO customer service.
WRONG LOAD CELL BRAND - PLEASE CONTACT CUSTOMER SERVICE	Wrong load cell brand.	Please contact METTLER TOLEDO customer service.
WRONG TYPE DATA SET - PLEASE CONTACT CUSTOMER SERVICE	Wrong type data set.	Please contact METTLER TOLEDO customer service.
BATTERY BACKUP LOST - CHECK DATE TIME SETTINGS	Backup battery is empty. This battery ensures that the date and time are not lost when the balance is disconnected from power.	Connect the balance to the power supply for charging the battery (e.g. during the night) or contact METTLER TOLEDO customer service.
	Overload - The weight on the pan exceeds the weighing capacity of the balance.	Reduce the weight on the weighing pan.
	Underload	Check that the weighing pan is positioned correctly.
ABOVE INITIAL ZERO RANGE	Wrong weighing pan or pan is not empty.	Mount correct weighing pan or unload weighing pan.
BELOW INITIAL ZERO RANGE	Wrong weighing pan or pan is missing.	Mount correct weighing pan.
MEM.FULL	Memory full.	Clear the memory and start a new evaluation.
FACTOR OUT OF RANGE	Factor is outside the allow range.	Select a new factor.
STEP OUT OF RANGE	Step is outside the allowed range.	Select a new step.

Error Message	Cause	Rectification
OUT OF RANGE	Sample weight is outside the allowed range.	Unload the pan and load a new sample weight.

Attention

In some countries, excessive mains voltage fluctuations and strong glitches may occur. This may affect the balance functions or damage the software. If this is the case, we recommend using the PowerPac-M-12V for stabilizing.

10.2 Status Messages

Status messages are displayed by means of small icons. The status icons indicate the following:

Status Icon	Signification
	Service Reminder Your balance is due for servicing. Contact your dealer's customer service department as soon as possible to have a technician service your balance. (See menu topic " SRV.ICON ")

11 Cleaning and Service

Every now and then, clean the weighing pan, draft shield element, bottom plate, draft shield (depending on the model) and housing of your balance. Your balance is made from high-quality, durable materials and can therefore be cleaned using a damp cloth or with a standard, mild cleaning agent.

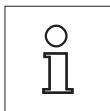
Please observe the following notes:



- The balance must be disconnected from the power supply
- Ensure that no liquid comes into contact with the balance or the AC adapter.
- Never open the balance or AC adapter – they contain no components, which can be cleaned, repaired or replaced by the user.



- On no account use cleaning agents which contain solvents or abrasive ingredients, as this can result in damage to the operation panel overlay.
- Do not use wet, but only damp cloth for cleaning.



Please contact your METTLER TOLEDO dealer for details of the available service options. Regular servicing by an authorized service engineer ensures constant accuracy for years to come and prolongs the service life of your balance.

12 Interface Specification

12.1 RS232C Interface

Each balance is equipped with an RS232C Interface COM1 as standard for the attachment of a peripheral device (e.g. printer or computer).

Schematic	Item	Specification
	Interface type	Voltage interface according to EIA RS-232C/DIN66020 CCITT V24/V.28)
	Max. cable length	15 m
	Signal level	Outputs: +5 V ... +15 V (RL = 3–7 kΩ) –5 V ... –15 V (RL = 3–7 kΩ) Inputs: +3 V ... +25 V –3 V ... –25 V
	Connector	Sub-D, 9-pole, female
	Operating mode	Full duplex
	Transmission mode	Bit-serial, asynchronous
	Transmission code	ASCII
	Baud rates	600, 1200, 2400, 4800, 9600, 19200, 38400 (software selectable)
	Bits/parity	7-bit/none, 7-bit/even, 7-bit/odd, 8-bit/none (software selectable)
	Stop bits	1 stop bit
	Handshake	None, XON/XOFF, RTS/CTS (software selectable)
	End-of-line	<CR><LF>, <CR>, <LF> (software selectable)
	Power supply for 2nd display	+ 12 V, max 40 mA (software selectable, 2nd display mode only)

Note: The second interface COM2 if present, has no power supply on Pin 9 for a 2nd display.

12.2 MT-SICS Interface Commands and Functions

Many of the instruments and balances used have to be capable of integration in a complex computer or data acquisition system.

To enable you to integrate balances in your system in a simple manner and utilize their capabilities to the full, most balance functions are also available as appropriate commands via the data interface.

All new METTLER TOLEDO balances launched on the market support the standardized command set "METTLER TOLEDO Standard Interface Command Set" (MT-SICS). The commands available depending on the functionality of the balance.

For further information please refer to the Reference Manual MT-SICS downloadable from the Internet under

► www.mt.com/sics-newclassic

13 Technical Data

13.1 General Data

Power Supply

- AC operation:

AC/DC Adapter

Primary: 100V–240V, $\pm 10\%$, 50/60Hz, 0.3 A

Secondary: 12VDC, 0.84A (with electronic overload protection)

Power supply to the balance: 8–20VDC, 10W



Use only with a tested AC Adapter with SELV output current.
Ensure correct polarity

< 1 W (**MT.GREEN**)

- Power consumption in standby mode:

8 standard AA (LR6) batteries (alkaline) for 8–15 hours of use.

- Battery operation:

Protection and Standards

- Overvoltage categorie:
- Degree of pollution:
- Protection:
- Standards for safety and EMC:
- Range of application:

III

2

Protected against dust and water.

See Declaration of Conformity

For use only in dry interior rooms

Environmental conditions

- Height above mean sea level:
- Ambient temperature range::
- Relative air humidity::

up to 4000 m

10 to 30 °C

10% to 80 % up to 31 °C, linearly decreasing to 50 % at 40 °C, non-condensing

- Warm-up time

After connecting the balance to the power supply or switched on in battery operation at least

- 30 minutes on balances with a readability of 0.001 g (0.01 ct) to 0.1 g.
- 60 minutes on balances with a readability of 0.1 mg (0.001 ct) and better.

Materials

- Housing:
- Weighing pan:
- Draft shield element:
- Draft shield:
- In-use-cover:

Top Housing: Plastic (ABS)

Bottom housing: Die-cast aluminum, lacquered

Stainless steel X2CrNiMo 17-12-2 (1.4404)

with 0.1 mg models: Stainless steel X2CrNiMo 17-12-2 (1.4404)

Plastic (ABS), glass

Plastic (ABS)

13.2 Model-Specific Data

13.2.1 Carat Balances with Readability of 0.001 ct

	JP503C	JS503C
Limit values		
Maximum capacity	500 ct / 100 g	500 ct / 100 g
Readability	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Repeatability (at nominal load)	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Linearity deviation	0.001 ct / 0.0002 g	0.001 ct / 0.0002 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	193x290x266 mm	193x290x266 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	165 mm	165 mm
Weight of balance	4 kg	4 kg
Weights for routine testing		
OIML CarePac	#11123002	#11123002
Weights	100 g F2, 5 g E2	100 g F2, 5 g E2
ASTM CarePac	#11123102	#11123102
Weights	100 g 1, 5 g 1	100 g 1, 5 g 1

	JP703C	JS703C
Limit values		
Maximum capacity	700 ct / 140 g	700 ct / 140 g
Readability	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Repeatability (at nominal load)	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Linearity deviation	0.001 ct / 0.0002 g	0.001 ct / 0.0002 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	193x290x266 mm	193x290x266 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	165 mm	165 mm
Weight of balance	4 kg	4 kg

	JP703C	JS703C
Weights for routine testing		
OIML CarePac	#11123002	#11123002
Weights	100 g F2, 5 g E2	100 g F2, 5 g E2
ASTM CarePac	#11123102	#11123102
Weights	100 g 1, 5 g 1	100 g 1, 5 g 1

	JP1203C	JS1203C
Limit values		
Maximum capacity	1200 ct / 240 g	1200 ct / 240 g
Readability	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Repeatability (at nominal load)	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Linearity deviation	0.001 ct / 0.0002 g	0.001 ct / 0.0002 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Internal adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	193x290x266 mm	193x290x266 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	165 mm	165 mm
Weight of balance	4 kg	4 kg
Weights for routine testing		
OIML CarePac	#11123001	#11123001
Weights	200 g F2, 10 g F1	200 g F2, 10 g F1
ASTM CarePac	#11123101	#11123101
Weights	200 g 1, 10 g 1	200 g 1, 10 g 1

	JP1603C	JS1603C
Limit values		
Maximum capacity	1600 ct / 320 g	1600 ct / 320 g
Readability	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Repeatability (at nominal load)	0.001 ct / 0.0001 g	0.001 ct / 0.0001 g
Linearity deviation	0.001 ct / 0.0002 g	0.001 ct / 0.0002 g
Sensitivity temperature drift	2 ppm/°C	2 ppm/°C
Typical values		
Repeatability (at nominal load)	0.08 mg	0.08 mg
Linearity deviation	0.06 mg	0.06 mg
Minimum sample weight (U=1 %, k=2)	0.016 g	0.016 g
Minimum sample weight OIML	0.01 g	0.01 g
Settling time	2 s	2 s
Adjustment	Int. Cal / FACT	Int. Cal

	JP1603C	JS1603C
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	193x290x266 mm	193x290x266 mm
Weighing pan dimensions	ø 90 mm	ø 90 mm
Usable height of draft shield	165 mm	165 mm
Weight of balance	4 kg	4 kg
Weights for routine testing		
OIML CarePac	#11123001	#11123001
Weights	200 g F2, 10 g F1	200 g F2, 10 g F1
ASTM CarePac	#11123101	#11123101
Weights	200 g 1, 10 g 1	200 g 1, 10 g 1

13.2.2 Gold Balances with Readability of 0.001 g

	JP303G	JS303G
Limit values		
Maximum capacity	320 g	320 g
Readability	0.001 g	0.001 g
Repeatability (at nominal load)	0.001 g	0.001 g
Linearity deviation	0.002 g	0.002 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.7 mg	0.7 mg
Linearity deviation	0.6 mg	0.6 mg
Minimum sample weight (U=1 %, k=2)	0.14 g	0.14 g
Minimum sample weight OIML	0.02 g	0.02 g
Settling time	1.5 s	1.5 s
Internal adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	193x290x266 mm	193x290x266 mm
Weighing pan dimensions	ø 120 mm	ø 120 mm
Usable height of draft shield	165 mm	165 mm
Weight of balance	4 kg	4 kg
Weights for routine testing		
OIML CarePac	#11123001	#11123001
Weights	200 g F2, 10 g F1	200 g F2, 10 g F1
ASTM CarePac	#11123101	#11123101
Weights	200 g 1, 10 g 1	200 g 1, 10 g 1

	JP503G	JS503G
Limit values		
Maximum capacity	520 g	520 g
Readability	0.001 g	0.001 g
Repeatability (at nominal load)	0.001 g	0.001 g
Linearity deviation	0.002 g	0.002 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		

	JP503G	JS503G
Repeatability (at nominal load)	0.7 mg	0.7 mg
Linearity deviation	0.6 mg	0.6 mg
Minimum sample weight (U=1 %, k=2)	0.14 g	0.14 g
Minimum sample weight OIML	0.02 g	0.02 g
Settling time	1.5 s	1.5 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	193x290x266 mm	193x290x266 mm
Weighing pan dimensions	ø 120 mm	ø 120 mm
Usable height of draft shield	165 mm	165 mm
Weight of balance	4 kg	4 kg
Weights for routine testing		
OIML CarePac	#11123007	#11123007
Weights	500 g F2, 20 g F1	500 g F2, 20 g F1
ASTM CarePac	#11123107	#11123107
Weights	500 g 1, 20 g 1	500 g 1, 20 g 1

13.2.3 Gold Balances with Readability of 0.01 g

	JP802G	JS802G
Limit values		
Maximum capacity	820 g	820 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.006 g	0.006 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	184x290x84 mm	184x290x84 mm
Weighing pan dimensions	170x190 mm	170x190 mm
Weight of balance	3.2 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123007	#11123007
Weights	500 g F2, 20 g F1	500 g F2, 20 g F1
ASTM CarePac	#11123107	#11123107
Weights	500 g 1, 20 g 1	500 g 1, 20 g 1

	JP2002G	JS2002G
Limit values		
Maximum capacity	2200 g	2200 g

	JP2002G	JS2002G
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.006 g	0.006 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	184x290x84 mm	184x290x84 mm
Weighing pan dimensions	170x190 mm	170x190 mm
Weight of balance	3.2 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123009	#11123009
Weights	2000 g F2, 100 g F2	2000 g F2, 100 g F2
ASTM CarePac	#11123109	#11123109
Weights	2000 g 1, 100 g 1	2000 g 1, 100 g 1

	JP3002G	JS3002G
Limit values		
Maximum capacity	3200 g	3200 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.006 g	0.006 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	184x290x84 mm	184x290x84 mm
Weighing pan dimensions	170x190 mm	170x190 mm
Weight of balance	3.2 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123009	#11123009
Weights	2000 g F2, 100 g F2	2000 g F2, 100 g F2
ASTM CarePac	#11123109	#11123109
Weights	2000 g 1, 100 g 1	2000 g 1, 100 g 1

	JP4002G	JS4002G
Limit values		
Maximum capacity	4200 g	4200 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.006 g	0.006 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	184x290x84 mm	184x290x84 mm
Weighing pan dimensions	170x190 mm	170x190 mm
Weight of balance	3.2 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123010	#11123010
Weights	2000 g F2, 200 g F2	2000 g F2, 200 g F2
ASTM CarePac	#11123110	#11123110
Weights	2000 g 4, 200 g 4	2000 g 4, 200 g 4

	JP6002G	JS6002G
Limit values		
Maximum capacity	6200 g	6200 g
Readability	0.01 g	0.01 g
Repeatability (at nominal load)	0.01 g	0.01 g
Linearity deviation	0.02 g	0.02 g
Sensitivity temperature drift	3 ppm/°C	3 ppm/°C
Typical values		
Repeatability (at nominal load)	0.007 g	0.007 g
Linearity deviation	0.006 g	0.006 g
Minimum sample weight (U=1 %, k=2)	1.4 g	1.4 g
Minimum sample weight OIML	0.5 g	0.5 g
Settling time	1 s	1 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	184x290x84 mm	184x290x84 mm
Weighing pan dimensions	170x190 mm	170x190 mm
Weight of balance	3.2 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123011	#11123011
Weights	5000 g F2, 200 g F2	5000 g F2, 200 g F2
ASTM CarePac	#11123111	#11123111
Weights	5000 g 4, 200 g 4	5000 g 4, 200 g 4

13.2.4 Gold Balances with Readability of 0.1 g

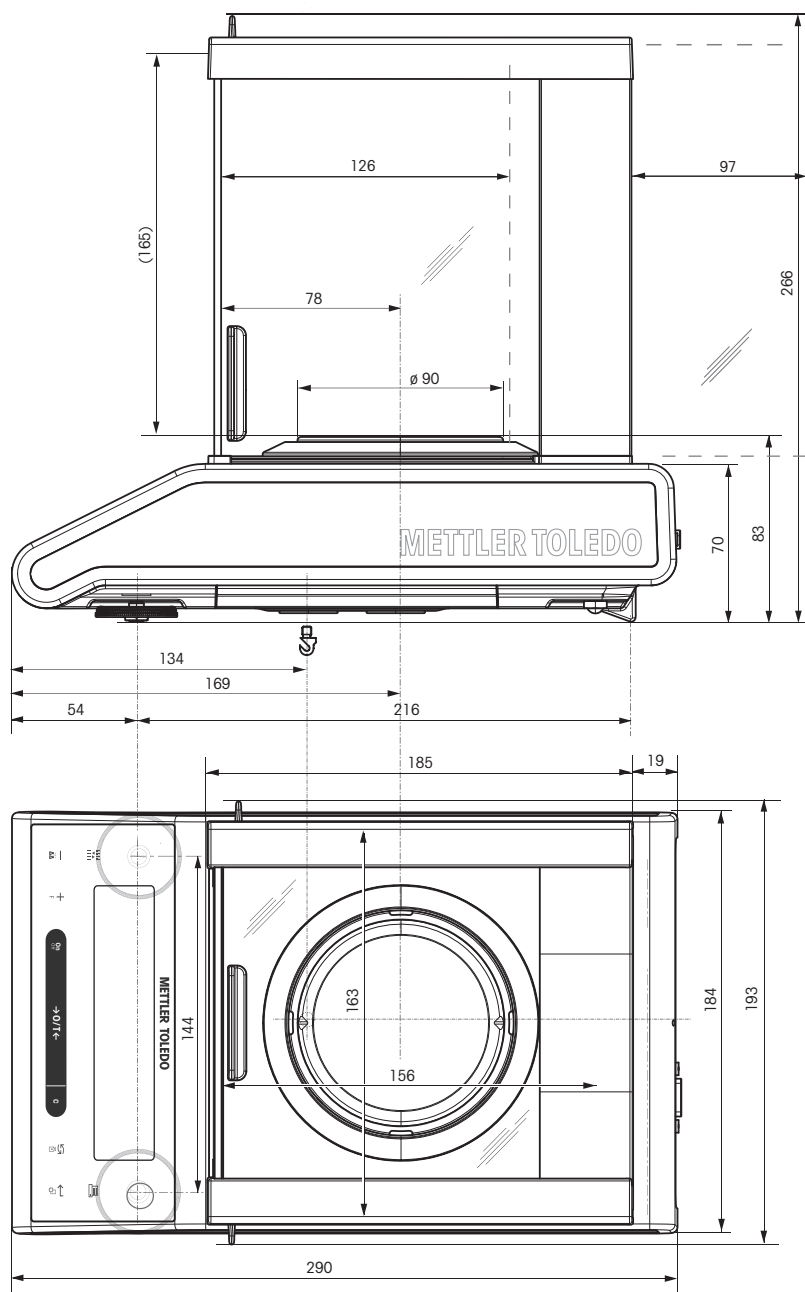
	JP8001G	JS8001G
Limit values		
Maximum capacity	8200 g	8200 g
Readability	0.1 g	0.1 g
Repeatability (at nominal load)	0.1 g	0.1 g
Linearity deviation	0.2 g	0.2 g
Sensitivity temperature drift	5 ppm/°C	5 ppm/°C
Typical values		
Repeatability (at nominal load)	0.07 g	0.07 g
Linearity deviation	0.06 g	0.06 g
Minimum sample weight (U=1 %, k=2)	14 g	14 g
Minimum sample weight OIML	5 g	5 g
Settling time	1 s	1 s
Adjustment	Int. Cal / FACT	Int. Cal
Interfaces	2 RS232	1 RS232
Balance dimensions (W x D x H)	184x290x84 mm	184x290x84 mm
Weighing pan dimensions	170x190 mm	170x190 mm
Weight of balance	3.2 kg	3.2 kg
Weights for routine testing		
OIML CarePac	#11123011	#11123011
Weights	5000 g F2, 200 g F2	5000 g F2, 200 g F2
ASTM CarePac	#11123111	#11123111
Weights	5000 g 4, 200 g 4	5000 g 4, 200 g 4

13.3 Dimensions

13.3.1 Carat Balances with Readability of 0.001 ct

Models:

JP503C
JS503C
JP703C
JS703C
JP1203C
JS1203C
JP1603C
JS1603C



13.3.2 Gold Balances with Readability of 0.001 g

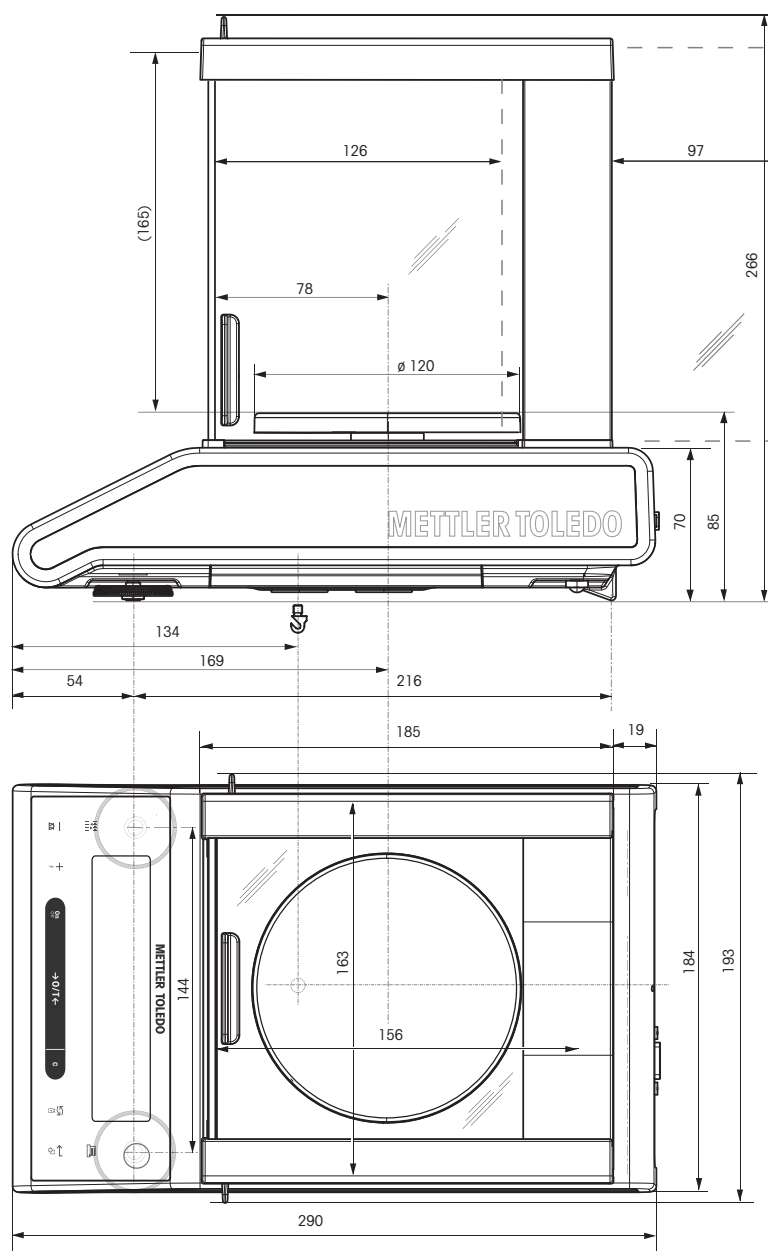
Models:

JP303G

JS303G

JP503G

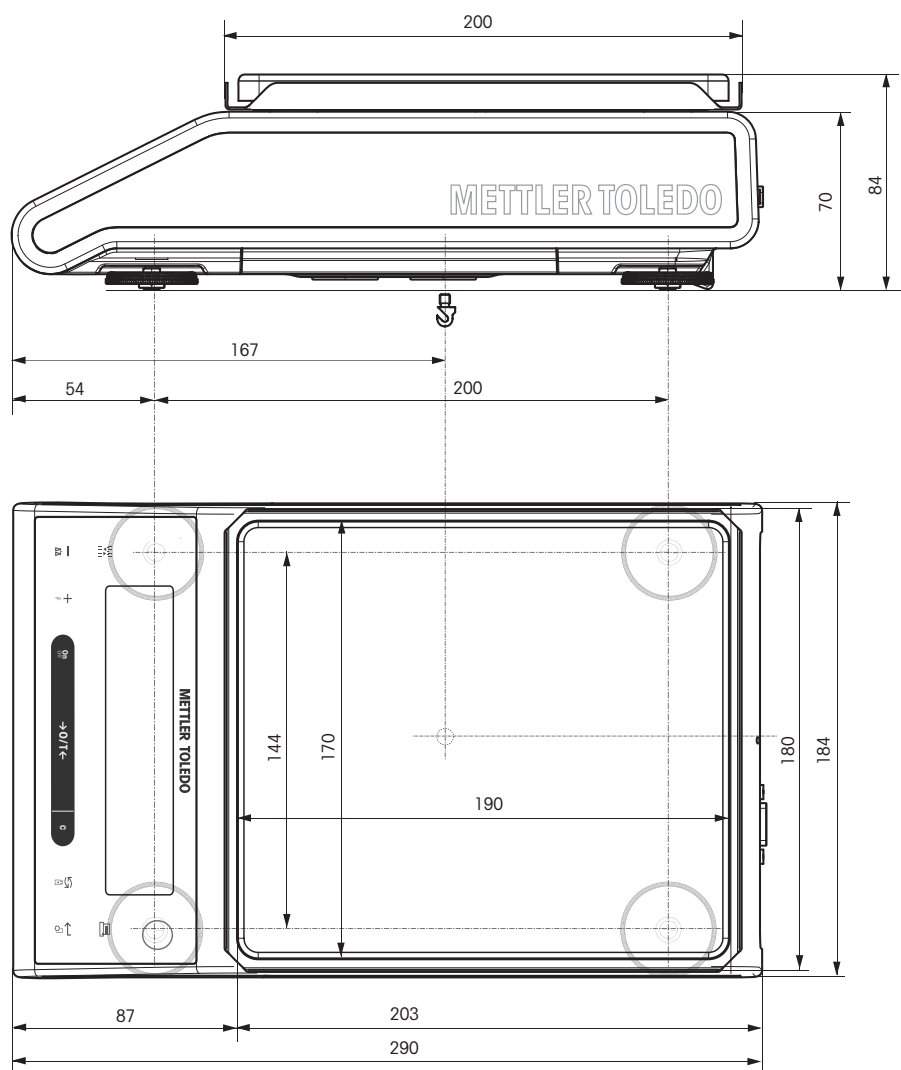
JS503G



13.3.3 Gold Balances with Readability of 0.01 g

Models:

JP802G
JS802G
JP2002G
JS2002G
JP3002G
JS3002G
JP4002G
JS4002G
JP6002G
JS6002G

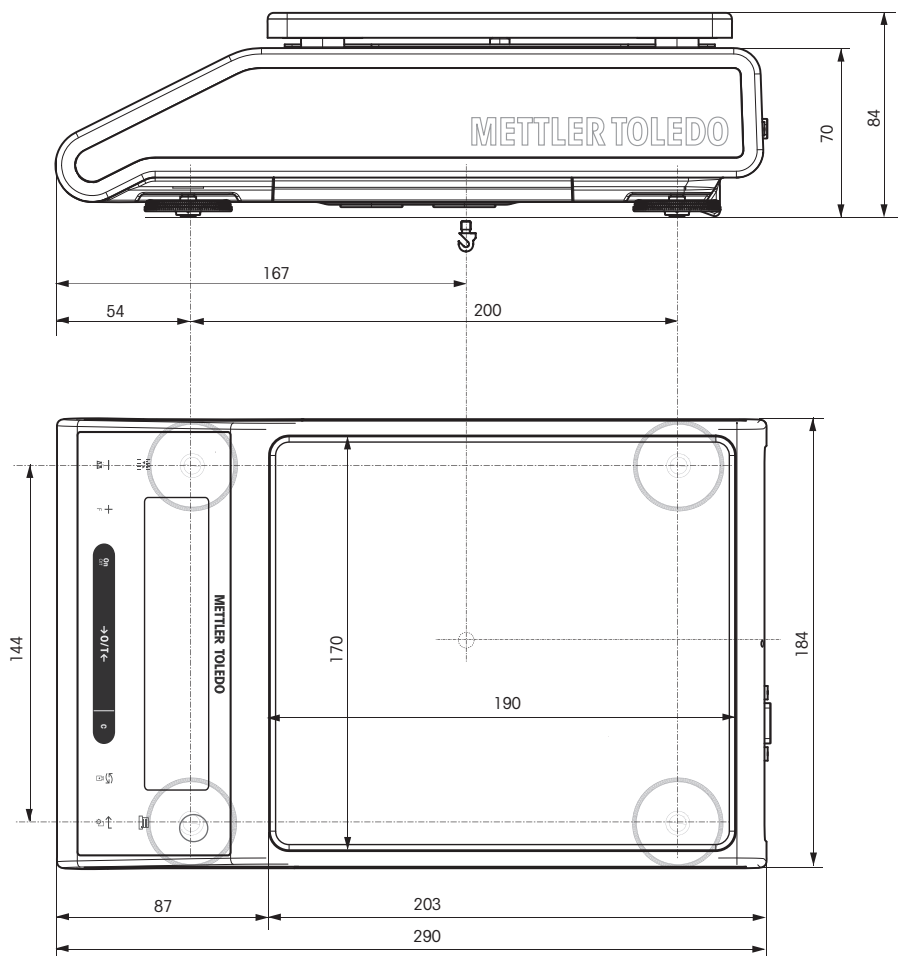


13.3.4 Gold Balances with Readability of 0.1 g

Models:

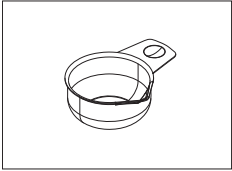
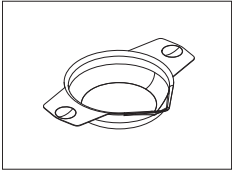
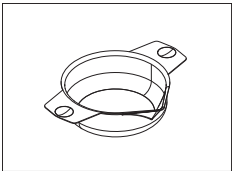
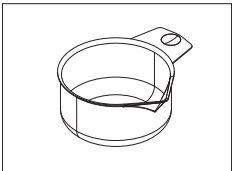
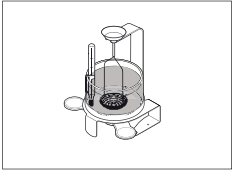
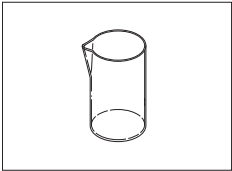
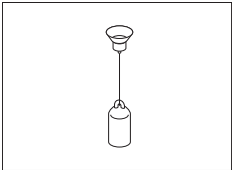
JP8001G

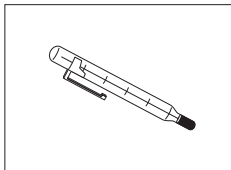
JS8001G



14 Accessories and Spare Parts

14.1 Accessories

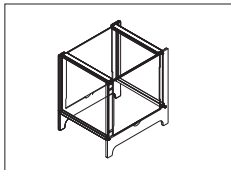
	Description	Part No.
Carat pans		
	Carat pan XS, Ø 50 mm / heigh 20 mm (set of 10 units)	12102565
	Carat pan S, Ø 80 mm / heigh 20 mm (set of 10 units)	12102645
	Carat pan M, Ø 90 mm / heigh 30 mm (set of 10 units)	12102646
	Carat pan L, Ø 90 mm / heigh 45 mm (set of 10 units)	12102647
Density determination		
	Density kit ML-DNY-43 for NewClassic ML Balances (d = 0.1 mg/1 mg)	11142144
	Glass beaker, height 100 mm, Ø 60 mm	00238167
	Sinker for density of liquids in conjunction with Density Kit Calibrated (sinkers + certificate) Recalibrated (new certificate)	00210260 00210672 00210674



Calibrated thermometer with certificate

11132685

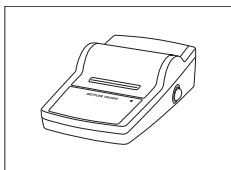
Draft shields



Draft shield ML-DS-21 for models with readability of 0.1 g up to 0.01 g.

12121015

Printers



RS-P28/11 printer with RS232C connection to balance (with date, time and applications)

11124309

Paper roll, set of 5 pcs

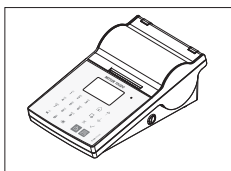
00072456

Paper roll, self-adhesive, set of 3 pcs

11600388

Ribbon cartridge, black, set of 2 pcs

00065975



P-58RUE Thermal Printer with RS232C, USB and Ethernet connections, simple printouts, Date and Time, Label printing, Balance applications: Statistics, Formulation, Totalling,

30094674

Paper roll, white, set of 10 pcs

30094723

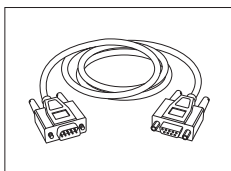
Paper roll, white, self-adhesive, set of 10 pcs

30094724

Paper roll, white, self-adhesive labels, set of 6 pcs

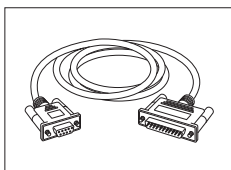
30094725

Cables for RS232C interface



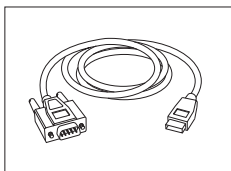
RS9 – RS9 (m/f): connection cable for PC, length = 1 m

11101051



RS9 – RS25 (m/f): connection cable for PC, length = 2 m

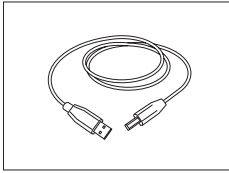
11101052



RS232 - USB converter cable – Cable with converter to connect a balance (RS232) to a USB port

64088427

Cables for USB interface



USB (A –B) connection cable for connection to PC,
length = 1 m

12130716

Cable replacement (wireless)

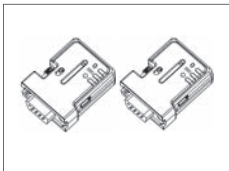


Bluetooth RS232 Serial Adapter ADP-BT-S for wireless connection between **printer** and Excellence balance* or between **balance** and PC*. Fits printers P-56 / P-58 and the following balance models (SW V2.20 or higher required): MS, MS-S/L, ML, PHS, JP, JS.

30086494

* Bluetooth interface required

- 1 Bluetooth RS232 Serial Adapter (slave)
- 1 MT-DB9 male to female connector
- 1 MT-DB9 male to male connector

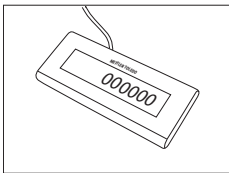


Bluetooth RS232 Serial Adapter set ADP-BT-P for wireless connection between printer and balance. Fits printers P-56 / P-58 and the following balance models (SW V2.20 or higher required): MS, MS-S/L, ML, PHS, JP, JS.

30086495

- 2 Bluetooth RS232 Serial Adapter paired (slave/master)
- 1 MT-DB9 male to female connector
- 1 MT-DB9 male to male connector

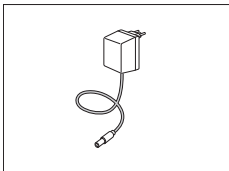
Auxiliary displays



RS232 auxiliary display AD-RS-J7

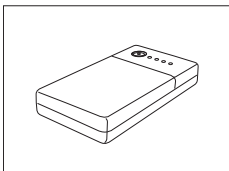
12122380

Power supplies



AC/DC universal adapter (EU, USA, AU, UK) 100–240 VAC,
50/60 Hz, 0.3 A, 12 VDC 0.84 A

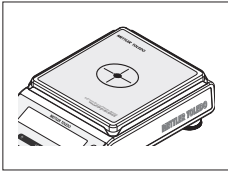
11120270



PowerPac-M-12V, for mains independent operation of balances, 12 VDC/1 A

12122363

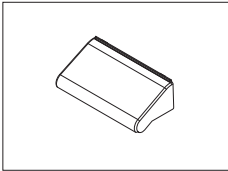
Pan protections



Protective foils, 164x184 mm, set of 20 pcs,
pan protection for weighing pan 170x190 mm

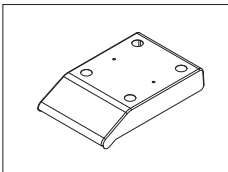
30113801

Protective covers



Protective cover for models with draft shield "165/235 mm"

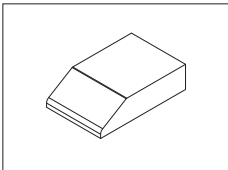
12122030



Protective cover for models with square weighing pan

12122031

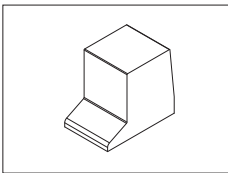
Dust covers



ML-DC-85

30028926

Dust cover for models without draft shield

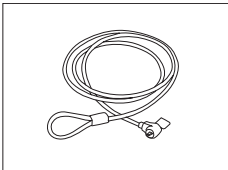


ML-DC-265

30028927

Dust cover for models with draft shield low (165 mm)

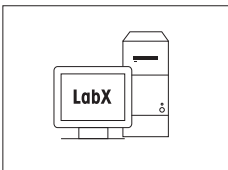
Anti-theft devices



Steel cable

11600361

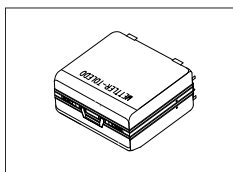
Software



LabX direct balance (simple data transfer)

11120340

Transport cases



Transport case

11124240

Adjustment weights



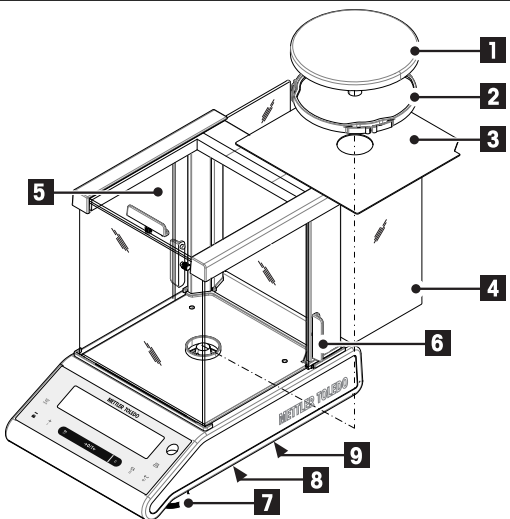
OIML / ASTM Weights (with calibration certificate) see www.mt.com/weights

14.2 Spare Parts

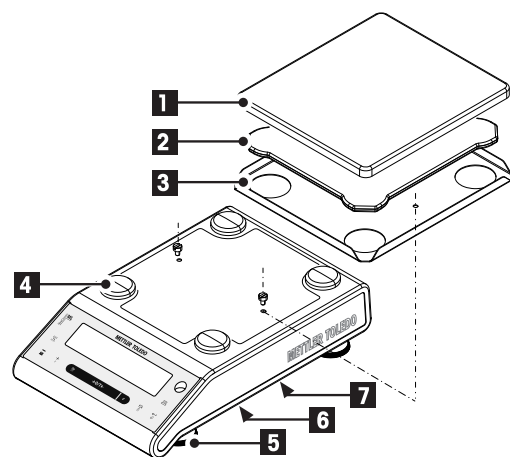
Carat Balances with Readability of 0.001 ct

Drawing	Pos	Description	Part No.
	1	Weighing pan Ø 90 mm	12122010
	2	Pan support	12122042
	3	Draft shield element	12122043
	4	Bottom plate	12122044
	5	Side glass door low	12122089
	6	Top glass door	12122033
	7	Pair of handles	12122035
	8	Leveling foot	12122040
	9	Battery-chamber cover	12122041
	10	Weighing below balance cap	12122029

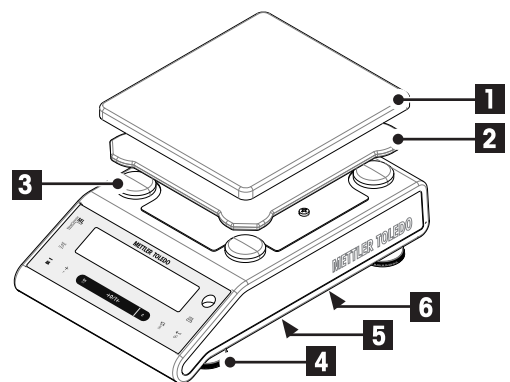
Gold Balances with Readability of 0.001 g

Drawing	Pos	Description	Part No.
	1	Weighing pan Ø 90 mm	12122010
		Weighing pan Ø 120 mm	12122037
	2	Pan support Ø 120 mm	12122045
	3	Bottom plate	12122044
	4	Side glass door low	12122089
	5	Top glass door	12122033
	6	Pair of handles	12122035
	7	Leveling foot	12122040
	8	Battery-chamber cover	12122041
	9	Weighing below balance cap	12122029

Balances with readability of 10 mg with square weighing pan and draft shield element

Drawing	Pos	Description	Part No.
	1	Weighing pan 170 mm x 190 mm	12122048
	2	Pan support	12122049
	3	Draft shield element	12122050
	4	Pan support cap	11131029
	5	Leveling foot	12122040
	6	Battery-chamber cover	12122041
	7	Weighing below balance cap	12122029

Balances with readability of 0.1 g with square weighing pan

Drawing	Pos	Description	Part No.
	1	Weighing pan 170 mm x 190 mm	12122048
	2	Pan support	12122049
	3	Pan support cap	11131029
	4	Leveling foot	12122040
	5	Battery-chamber cover	12122041
	6	Weighing below balance cap	12122029

Index

A

AC operation	16
Adjusting	18
Adjustment	20, 29, 29
Advanced menu	25, 29
Ambient conditions	15
Application "Check Weighing"	42
Application "Density"	53
Application "Diagnostics"	31, 62
Application "Division Factor Weighing"	51
Application "Multiplication Factor Weighing"	49
Application "Percent Weighing"	40
Application "Piece Counting"	37
Application "Routine Test"	59
Application "Statistics"	45
Application "Totaling"	47
Application "Weighing"	22
Application icons	11
Assign Application	31
Auto print	33
Automatic adjustment	19
Automatic shutoff	30
Automatic zero setting	31
Autozero	31
Average (Statistics)	45

B

Backlight	31
Balance history	65
Balance information	67
Basic menu	25, 27
Battery operation	16
Baudrate	35
Beep	28, 28
Bit/Parity	35

C

Calibration	29
Calibration history	66
Cancel	27
Change settings	26, 26
Char Set	36
Check Weighing	42
Cleaning	75
Closing the menu	26
Control Limit	60
Conventions and symbols	7
Customer fine adjustment	20, 29

D

Data communication format	33
Date	27
Date format	30
Delivery inspection	13

Density	53
Density kit	53
Density table for distilled water	57
Density table for ethanol	58
Diagnose	31
Diagnostics	62
Diagnostics application	31
Display	33
Display panel	11
Display test	63
Disposal	8
Distilled water	57
Division Factor Weighing	51
Dosing	29
Draft Shield	14, 75

E

End of Line	36
Environment	29
Error messages	73
Ethanol	58
External weight	19

F

FACT	19, 29, 30
Factor Weighing	49, 51
Firmware update	71
Fully automatic adjustment	19, 29
Function PC-Direct	69

G

Good Weighing Practice	59
GWP	59, 60

H

Handshake	35
Header	33
Host	32

I

Icons	11
Input principle	26
Installing the components	14
Interface	
MT-SICS	76
Interface menu	25, 32, 32
Interface RS232C	32, 76
Internal weight	19
Interval	36
Introduction	7

K

Key assign	31
Key beep	28
Key functions	10
Key test	64

L

Leveling the balance	15
----------------------	----

Line feed	33	Setting up the balance	13
Liquid	53	Shutoff	22, 30
Liquids	55	Signature line	33
Location	15	Sinker	53, 55
M		Software update	71
Main Menu	27	Solids	53
Manual adjustment with external weight	19	SOP	60
Manual adjustment with internal weight	19	Spare parts	93
Menu	25, 27	Stability beep	28
Menu Advanced	25, 29	Standard Deviation (Statistics)	45
Menu Basic	25, 27	Statistics	45
Menu Interface	25, 32, 32	Status icons	11
Menu operation	26	Status messages	74
Menu protection	27	Stop bit	35
Menu topic	26, 26, 27	Submenu	26
Motor test	65	Switching	
MT-SICS	76	On	18
Multiplication Factor Weighing	49	Switching the balance on and off	22
N		Switching weight units	23
Numerical values	26	Symbols and conventions	7
O		T	
Operating temperature	18	Technical data general	77
Operation keys	10	Time	27
P		Time format	30
PC-DIR	32	Topic	26, 26, 27
PC-Direct	69	Totaling	47
Percent Weighing	40	Transmit data	24
Performing a simple weighing	23	Transporting the balance	17
Piece Counting	37	U	
Power supply	16	Unit	28, 28
Print	24	Unpacking	13
Printer	32	W	
Protect	27	Warm-up time	18, 77
Protocol trigger	30	Warning Limit	60
R		Weighing below the balance	18
Recall	24, 30	Weighing made simple	22
Repeatability test	62	Weighing mode	29
Reset	28	Weighing-in aid	24
Routine Test	59	Weight unit	23, 28, 28
RS232C interface	32, 76	Z	
S		Zero print	33
Safety precautions	8	Zero setting	23
Saving settings	26	Zeroing	31
Select menu	26		
Select menu topic	26		
Selecting the location	15		
Service	32, 32, 75		
Service date reset	32		
Service icon	32		
Service provider information	68		
Service reminder	32		

GWP® – Good Weighing Practice™

The global weighing guideline GWP® reduces risks associated with your weighing processes and helps to

- choose the appropriate balance
- reduce costs by optimizing testing procedures
- comply with the most common regulatory requirements

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